ESTHER DYSON'S MONTHLY REPORT

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Back to the Frontier:

The 2002 PC Forum Roundup

BY ESTHER DYSON AND KEVIN WERBACH

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Welcome to PC Forum 2002, our 25th anniversary. The year 1977 seems long ago, but so does most of 2001! At last year's PC Forum, people were already worrying about the year that followed, but no one expected all that took place: September 11, plummeting stock prices, bankruptcies, Enron, travel troubles....

But for people on the Frontier, problems create opportunities. There's a lot to do to put the world together and move forward. The last couple of years have been painful for many of us, but they have also forced a worthwhile focus on the mundane – true usefulness and value for money. There's less wild imagination, more solid implementation; fewer short-term jackpots but more "long bets" – strategic initiatives with outcomes influenced by effort and creativity.

We're in a time when the things that brought many of us to this market – the ability to build a product or a company – are back. We're at the frontier again, not caught in a mirror world of glitz, spin and metrics of clicks and eyeballs signifying nothing.

What does matter this year? The Net itself matters. It is at the heart of most of what we do, and now we realize that we are part of the ecosystem that determines its rules. The decisions of businesses such as Intel, Sun and Microsoft, of legislators/regulators such as Maria Cantwell and Michael Powell, and of users and vendors will determine the fate of policies as well as products. There's a delicate interplay among technical capabilities, business models and legal rights. Going forward, we need to get them back into sync in areas from copyright to digital identity and personal privacy.

{ continued on page 2 }

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The conversation starts here.

There's also interplay between financial markets and time horizons. How far out are investors willing to look? How effectively can startups trade growth for immediate returns and how secure can they make those returns look? Exactly how is the playing field tilted, and how should the government realign it to the benefit of all? Areas for investment include plain old enterprise applications, made more flexible by Web services; local wireless, especially using unlicensed spectrum; mechanisms to improve security; and all the applications that will use and drive broadband and wireless growth.

Beneath it all, business models are evolving. We're moving from sales of products to revenue streams based on outsourced services, subscriptions to software (upgrades included), and access to information or results. Prices are dynamic, and reflect everything from market demand to (CRM-based) calculations of a customer's lifetime value. Content is valuable, but we need to find new ways to distribute and charge for it.

In short, welcome back! There's a lot of work to do on the frontier, and a lot of value to be added. Have a great time here in Scottsdale, and for the next 25 years!

–Esther, Kevin, Daphne

The Forum is organized into a series of panels and interviews in the mornings, and presentations and demonstrations in the afternoons, over three days. Below, we provide an introduction to all the morning and afternoon sessions, and a look at the companies and people who will be part of this year's event. Where relevant, the moderator and author of the session (Esther Dyson or Kevin Werbach) is identified by initials following the title. For the startup clusters, the last name of the moderator (Clay Shirky or Cory Doctorow) is identified.

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SUNDAY, MARCH 24

PANEL: Control Over Information – The Battle for the Soul of the Net (ED and KW)

The Internet began as a concept, connecting real people and real machines, but it had no particular legal status. It was not someone's property, and it didn't exist anywhere in particular. But like most things in the digital world, it emerged into something else – a platform not just for functionality but for content and behavior. Its rules, at first implicit, now reflect the interactions of technology, law and human nature, leavened by commercial imperatives.

These rules are now the subject of intense dispute. Once the preserve of scientists and techies, the Internet is now a place for copyrighted music and idle gossip, for commerce and conspiracy.

But who sets its rules? Technology has changed things – not the laws of economics, but the abilities of individuals to copy content, spread lies and communicate with anyone they please. The physical constraints of the pre-Net era no longer apply. Strangers can cooperate, for better or worse. We can no longer rely on friendly neighbors to keep people in line, without the heavy hand of an all-powerful government.

And so, rule-makers are taking action, as Maria Cantwell can report, on everything from copyright and privacy to spam and "objectionable" speech. Under pressure from the content industries (represented on the panel by Hilary Rosen), Congress is holding hearings on copyright protection, at one of which Les Vadasz recently testified. Meanwhile, intrepid developers are working to build systems so decentralized no one can shut them down, and Mitch Kapor is working on bottom-up alternatives to market standards.

How can the high-tech industry respond? How should it?

The most immediate questions concern intellectual property, but the fundamental issue is control. The Internet is more all-or-nothing than the physical world. It spans the globe; most laws are local ordinances. Markets are increasingly winner-take-all, and while there is no place to hide – you can be tracked anywhere – the Net has more dark corners than Stephen King can dream of. Governments fear people slipping out of their grasp, even as they attempt to control behavior beyond their borders. As an industry, we can no longer ignore these issues. Otherwise, they will be decided without us.

Maria Cantwell, US Senate – Still our woman in Washington

Last year, Maria Cantwell was slated to speak at PC Forum but had to cancel at the last minute to take part in a vote on campaign finance reform. Now, a year later, she expects to see a bill ready for President Bush's signature before she leaves Washington (DC) for PC Forum. We've scheduled her again in the hope that she can make it this time!

Even though so much of the context has changed, campaign finance reform has remained a key issue for her: "If people weren't out trying to raise money, they'd have more time to focus on the issues. And at the very least, that money influences what issues you focus on."

Overall, she's concerned that Congressmembers don't have time to learn about new things – whether the tech industry or implications of the nation's new security rules.

"As they've gotten exposure to the people in Congress, the people that I know in high tech are surprised that the members don't get it," she says. "They're surprised that members can be late adopters, that they haven't turned on their computers. There are some early adopters, particularly in the Senate Judiciary Committee, but they're few in number when you consider Congress as a whole."

She continues: "Copyright, privacy, patent laws, these are fundamental underpinnings for how the economy will grow. But many of these issues are arcane and the number of members who grasp them is minimal. The number who could jump in effectively is even smaller. People have this perception that they'll go to Congress and get understanding. It's not the big player with long history that, say, entertainment has been, with years of visibility on Capitol Hill."

Cantwell is an important intermediary between the high-tech world and Congress. On the political side, she is a mix of many legends: poor family (of which she was the first to graduate from college), a construction-worker father who became an Indiana state legislator. She herself became a state representative in Washington at the age of 28. But she brings some thoroughly modern strands to the mix: She was an effective fighter against the Clipper Chip during her first stint in Washington as a US representative from Washington State from 1992 to 1995, and helped to fight against export controls on encryption software. Then she chucked it all to join a Seattle startup, RealNetworks, founded by ex-Microsoftie and EFF board member Rob Glaser. And then she chucked that, took the fortune she had made, and won a seat as a Democratic US Senator from Washington starting January 2001.

Willing, yes, but able?

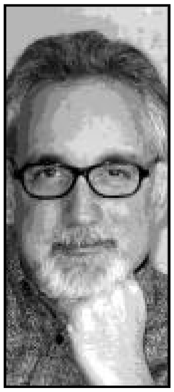
She doesn't think Congress should necessarily get too intimately involved with high tech. "Obviously," she says, "there are now new ways for information to flow. We have principles on the books that define concepts such as freedom of speech and privacy, but we need to take a fresh look to make sure that our principles are adhered to. There are things now that we didn't imagine when those principles were defined. However, when I think about Congress, I don't think it's necessarily good or easy for them to get too involved in these issues. We often end up being very prescriptive. It's better to outline principles and key rights we want protected."

For example, she says, "When the Judiciary Committee was changing copyright law to make it easier for schools to use copyrighted materials in online education, there was a fight not to put the government in the position of setting the standards for copy protection technology. Now the effort is being led by a couple of film studios to get a single government-mandated standard for digital TV, PCs, handhelds – anything."

She continues, "It would be better to allow business models to develop in the private sector. I worry about government picking winners and losers, or having some government agency in charge of determining the best security methods."

Meanwhile, she is concerned about the government's *application* of security technologies: "US citizenship has its privileges, and one of those is privacy. We've blurred the lines between intelligence-gathering on foreign agents and domestic requirements for US citizens in the Patriot Act, and further through the President's executive order and John Ashcroft's new rules. We need to monitor more closely how these new powers are being used; we have to watch the watchers."

Mitch Kapor, Open Source Applications Foundation – The original frontiersman



Mitch Kapor is a long-time PC Forum veteran. He has attended many times over the years, representing first Lotus, the company he founded in 1982, then the Electronic Frontier Foundation, which he co-founded, and more recently Accel Partners. This year, this pioneer is back as chairman of the Open Source Applications Foundation, a sort of money-where-your-mouth-is instantiation of his long-time fascination with open standards and their benefits.

He says, "Intellectual property issues continue to interest me a lot, but I'm focusing on open source as a social and creative phenomenon, rather than because it's 'freebeer free'. There are just some areas of software infrastructure so vital to society that they're too important to be proprietary."

Do you mean that they should be free, or that open standards should be enforced? we ask. "Just that there ought to be a nonproprietary option for people." And rather than mandate it, Kapor feels a personal responsibility to help provide it.

"I'd say there are some other areas of software infrastructure as important as Linux – for example, a platform for educational applications on broadband. This needs to be funded by foundations and NGOs and created and managed on an open-source basis. The social need and the opportunity are there. I'm trying to work with foundations to educate them. The Open Source Applications Foundation is an effort to take the Linux model and apply it in the horizontal application space.

"Right now we are just four full-time people, beavering away. Some of the work is inspired by and consistent with Tim Berners-Lee's semantic Web movement. There are tools for personal information management and small group collaboration. It's not just infrastructure but highly polished apps for normal citizens to use. And yes, they will be cross-platform. You can't say, 'These apps are great and they're for you, but oh, they run only on Linux'.

"I have always had an issue with the commercial software world: Are the end-users' long-term interests really being served? Now I'm just back in the world of doing great stuff independently that can add value...." On the other hand, he admits to his own agenda: "To the extent that there are viable alternatives in the horizontal applications area to Microsoft, I think it's a very good thing. I think of us as an alternative, not competition. When Linus Torvalds first released Linux ten-plus years ago, he wasn't trying to take market share from Microsoft."

Back to the EFF

Kapor has also recently gotten re-involved with the Electronic Frontier Foundation, which he co-founded in 1990. [DISCLOSURE: ESTHER DYSON WAS A DIRECTOR FROM 1991 TO 1998, AND CHAIRMAN FROM 1995 TO 1997.] "The issues now are the same but the stakes are higher," he says. "Technology has gotten to a point where so many more things are possible, but there is more and more dominance by monopolies and oligopolies who do not serve us well. Unfortunately, they are getting a lot of help from Congress and the courts in turning the intellectual property system into a sledgehammer for corporate interests."

"We still need architectures that don't require or even permit one corporate player to act as a gatekeeper. So, it's not just Microsoft or AOL Time Warner I'm unhappy with, but also VeriSign, which in my view is a principal impediment to widespread security. I've had conversations recently with key EFF staff, and I've given them some funding. There's a fairly wide diversity of opinion on the EFF board, but a lot of common ground on the need to overturn the Digital Millennium Copyright Act."

Kapor adds: "I'm project-focused now. My dance card is full and you just have to pick your battles. But one of my projects is speaking up on things I care about. For example, Long Bets [*Tuesday evening at PC Forum*]: I have this bet with Ray Kurzweil. He says we'll have super-intelligent computers that can pass the Turing test and I have taken the position that it won't happen by 2029. The reason I do this is that people who support that position generally don't appreciate the qualities that make humans human.... It bothers me how popular that lack of understanding is."

Hilary Rosen, RIAA – The music industry's woman in our world

To the outside world, Hilary Rosen may be the copyright cop. To people within the music industry she represents as president and ceo of the Recording Industry Association of America, she is the voice defending their interests, even as she sometimes reminds them of truths they don't always want to hear.

She recalls our first meeting in 1997, when I (Esther) predicted that easy distribution and duplication of content (apart from copyright issues) would threaten the basics of the music business: "The only thing clear to me now," she says, "is how grey it all is... which is an evolution for me since that time. Much of what you said turned out to be right." (She's a good diplomat, at least with people willing to listen!)

"Our enforcement efforts get all the attention, and most people don't argue that we shouldn't enforce copyright. But our role [at RIAA] is not a strategy; it's a tool. No enforcement tool can or should substitute for good pro-active business strategy."

She focuses on the economics of the business, "Much of what the industry executives are saying and doing hasn't really changed, in terms of how they recoup their investment. Unfortunately, even though the fixed costs of creating content and making it popular don't change, the returns do. People argue that if you didn't try to make music so popular (i.e. spend so much money), you could sell it for less.... That could be true, but it's not a model for investment. But, overall, we haven't made as much of a shift as we have to towards making music into a service rather than a product."

The RIAA's 300-plus members rely on it for help in Washington and with the high-tech industry, but Rosen knows that the solution is elsewhere – within their market: "I believe people who promote the KaZaa software should be liable. They're in it to make money for themselves, profiting off our investment. But we also have to recognize that our music fans have absorbed this distribution system into their daily behavior. To think we can change that is naïve."

But they are still trying – if not to change how people use the system, at least to change how they pay for it. "We have not been able to convince the technology industry that standards for security is a good business strategy for them. We have yet to figure out how to get Real and Microsoft to agree on compatible secure media players. If you want a more regulated download environment, you have to have a consistent hardware environment. In the past, the recorded-music industry lived with the consumer electronics industry, where everyone falls in line with standards. But with the computer and IT industry," she says delicately, "the opportunity for cooperation has been really different."

Moreover, she notes, "We have not figured out how to use this technology to our best advantage." For example, she relates, "An artist's manager recently told me they had sold out two shows in Madison, Wisconsin – 10,000 tickets in a day. But they had sold only 2000 albums in total. 'So how do 10,000 people know they like us?' the guy asked. They must have downloaded the music."

In fact, successful artists make most of their money on advances received from record companies, touring, promotions and endorsements (just like Olympic athletes). But album sales are the initial measure of success that drive those other contracts and revenues. Couldn't the industry simply do better record-keeping of what's downloaded so they could get the benefits of being popular? we ask. That would serve the artists, true, but not the record companies who rely on album sales.

Deliberately provocative

We said that, not Rosen. But, she concurs, "Sometimes you try to be deliberately provocative to provoke interesting discussion. The way we run our business now is like saying we sell Coca-Cola only in 64-ounce bottles. We need to figure out how to do fountain syrup, six-packs and keychain give-aways."

She continues, "But over the last year, there has been lots of progress. People are smarter. They know their consumer better. New subscription services are starting: MusicNet, Pressplay, Listen.com, Napster, RealMusic, a bunch of competitors.

Subscription services are not the only answer. But we do need to be experimenting with different models. People are actually looking at deals with artists and restructuring them. Record companies are acting not only as manufacturer and distributor, but more like a VC, focusing on funding and promotion. Instead of only writing contracts, they're starting joint ventures with artists. We're at a crossroads."

Les Vadasz, Intel – Mr. Vadasz goes to Washington

Les Vadasz is executive vp at Intel and president of Intel Capital, the VC arm he created in the early 90s. He says, "I spent virtually all of my career at the intersection of new technology and new businesses, figuring out how to create businesses out of technology." Indeed, in a variety of management roles, he was in charge of delivering most of Intel's key technologies: DRAM, the microprocessor, ePROMs.

He joined Intel with the founding team in 1968, at a time when the Valley was on the moon as far as Washington was concerned and vice versa. "In those days, we had a libertarian view towards Washington: 'You don't understand; keep out of our way'.

"The first time we thought Washington needed a role was when our industry was under siege from Japan, and had to deal with the issue of dumping. We realized that this was an issue, and that technology alone couldn't solve it. And so we reached out to Washington in the late 70s."

He continues: "Now it's a different situation, not just one industry. We cannot say the Net will have a huge influence on everyday life, and also say, 'Hey Washington, keep out of it.' Those two statements don't compute.

"The Internet increasingly links industries which have grown large independent of one another, and that raises complex issues. For example, what is 'fair use' in these times? We need to codify that somehow. If it could happen without government, fine. But governments exist to codify collective rules."

To help that process was his reason for venturing to Washington recently to testify before the Senate Commerce Committee on "Protecting content in the digital age, promoting broadband and the digital television transition." He sat with Michael Eisner of Disney and Peter Chernin of Fox; they were followed by Jack Valenti of the Motion Picture Association of America. "There were no consumers at that hearing, not one single organization representing the consumer," he points out. "Consumers had no voice. We [Intel] were the closest thing to it. There's something wrong when an industry with its own self-interest is the only one representing the consumer."

Indeed, Vadasz stood alone against the old Washington hands from the entertainment industry, well described by Maria Cantwell above. And as we'll discuss on the panel, Congress is deliberating these issues right now.

Vadasz is adamant that technology exists to serve its users: "Once you buy something, you should be able to use it as you please. If you want to commercially benefit from it, that's another story. I'm not for free-everything on the Internet: If everything is free, you get what you pay for – nothing!

"But the notion that I'm not supposed to have a DVD on my hard drive to take on a trip bothers me. We are criminalizing the actions of tens of millions of people who will be doing what comes naturally. This [movies] is an industry that has come from a mentality of pay-per-view-per-person. They have a bit of a hard time grappling with the fact that when you have a VCR tape, more than one person will view it more than one time. They would rather neuter the PC than to adapt their business to the new opportunities provided by the Net.

"What was disappointing was that the hearing's only focus was how to protect content, rather than thinking about what that means from the point of view of the consumer. I tried to illustrate it with a SACD [super audio CD]: You can't play it on a PC. It contradicts years and years of consumer experience. Suddenly stores are selling disks that don't play!"

Fair enough, but how should the industry deal with Hollywood's concerns? "Rather than neuter the PC, you make the package more secure. DRM [digital rights management] technologies allow a variety of security measures."

He concedes: "I do sometimes worry about the subculture that we're creating. I didn't say anything about culture in Congress, but I've been thinking about it since. That's a harder issue! Society doesn't live by laws written down in books alone, but also by practices that we consider right or wrong. When we glorify the kid that does this kind of stuff on the Net, when we fund business plans that foster illegal use... that is not right."

INTERVIEW: For Whom Ma Bell Tolls (KW)

Dave Dorman, AT&T

Dave Dorman has been president of AT&T for a little more than a year. But what a year! AT&T, once one of the world's most powerful corporations, has seen its very survival questioned amid the telecom slump.

"It has been chaotic," Dorman acknowledges. "Obviously the first order of business we had was to shore up the balance sheet by shedding debt, which we did in very rapid fashion." AT&T spun off its wireless assets and agreed to sell its broadband unit to Comcast, abandoning its $100-billion effort to deliver local phone and Internet services over cable TV wires.

From the outside, the new new AT&T looks much like the old old pre-divestiture AT&T. It's still the biggest long-distance company in the country. It has a huge business-services operation selling both voice and data services, including the operations of the former IBM Global Network and the international network that was part of Concert, its now-dissolved joint venture with British Telecom. Yet the world around it has completely changed. "The old AT&T had a lot more luxury than the current AT&T does to be patient," Dorman observes.

Dorman is pushing further cost-saving "lifestyle choices," such as selling the expensive headquarters building in New Jersey and curtailing spending on basic research at AT&T Labs. But he's also working to expand the business from its large base of enterprise customers. "In an industry where scale has always been important, it has gotten more important as prices came down," Dorman explains.

One growth area is managed services. "Customers are telling us they want us to provide more than just pipes," Dorman says. AT&T is also ramping up its local service offerings. That business is expanding 20 percent per year and grew to 2.9 million local-access lines in 2001, Dorman notes, though it's often ignored in the context of AT&T's overall numbers.

Stormin' Dorman

Dorman's career mirrors the changes in the telecommunications and high-tech industries. He began at Isacom, a telecom startup that was acquired by United Telecommunications. With the opening of the long-distance market to competition, United became Sprint, where Dorman rose to become head of business services. In 1994, shy of his 40th birthday, he was named ceo of Pacific Bell. Lured by the prospects of dotcom riches, he became ceo of Pointcast, the pioneering push technology startup. Pointcast never quite regained its early glory, and in April 1999, Dorman rejoined the telecom world as ceo of Concert. He was named AT&T president in November 2000.

Today's environment, Dorman says, calls for new skills. "If you look at the guys who historically ran the Bell companies, they've typically been really solid administrators in a closed environment," he says. "I think the ceos in this industry going forward will have to have a deep appreciation of sales and marketing."

AT&T ceo Michael Armstrong has indicated that he plans to retire and become chairman of AT&T Comcast after the deal closes. Conventional wisdom is that Dorman, who was just named to AT&T's board, will be Armstrong's successor.

AT&T's two most recent leaders were deliberately brought in as outsiders to shake up an insular company. Dorman is a telecom guy, but one with varied experiences outside of AT&T. He's also a Southerner at a company with deep roots in the Northeast. As a self-professed techie and former ceo of a dotcom, he's particularly well-positioned to understand how the Internet and communications worlds will influence one another.

Like it or not, there wouldn't *be* a high-tech industry without AT&T. This is the company that brought the world the transistor, the laser, information theory and Unix... and along the way created the model for national and global communications networks. Dorman stresses that AT&T still has the technical savvy to compete in a data-centric world. "AT&T has great intellectual capacity in its people," says Dorman. "I have a better team here than at any of my previous jobs." He points to cto Hossein Eslambolchi, who holds more than 90 patents, as an example.

Despite the difficulties, Dorman says, "It has been enormously intellectually challenging because you're trying to figure out where daylight is and how to run for it... against the backdrop of all the iconography of AT&T." The challenge appeals to him. "The bar has been raised," he declares, "and I relish it."

INTERVIEW: The New Powell Doctrine (KW)

Michael Powell, Federal Communications Commission

The chairman of the FCC brings much more to his job than being the son of the US Secretary of State. Before Michael Powell took on his current position, he spent three years as an FCC commissioner. Surprisingly, few of his predecessors had prior experience at the agency. “I’ve seen everything from the rise of the Internet bubble and the telecommunications response, to the collapse of it,” he says. “For me, that provides many more opportunities to graph and compare lessons learned than if I had just walked into the building one day.”

Before the FCC, Powell was chief of staff for the Antitrust Division of the Department of Justice. The small matter of *US v. Microsoft* was initiated during his time at Justice, and more generally, Powell says, “I’ve had to work through a lot of history and precedent about competitive and anti-competitive behavior, and a lot more about the behavior of firms under different circumstances.”

All of which comes in handy in evaluating issues before the FCC, where antitrust concepts are thrown around frequently. “A lot of people talk the talk, but don’t know what they’re talking about,” Powell observes.

Not that Powell is a comfortable insider. To the contrary, he intends to be an aggressive reformer. “The classic regulatory model in many ways is a very good one for static and mature systems,” he argues, pointing to the established telephone industry. On the other hand, he continues, “There’s a very different kind of institution and intellectual capital needed for addressing the dynamic markets driven by a technological revolution.” That means changing the agency as well as its policies. “The institution itself has to have an entirely different mix of assets and focus and doctrine,” says Powell.

Powell has made it a priority to improve the FCC’s technical and economic analysis capabilities. “When we did the AOL/Time Warner merger,” he recalls, “here we were, sitting around waiting for Steve Case and Bill Gates to teach us about their technology so we could rule on it.” To help the agency do better independent analysis, Powell hired more engineers during his first year as chairman than the Commission had over the previous 20.

Costs and benefits

On the issues, Powell has emerged as a strong advocate of deregulation and of a limited role for the FCC: "The interesting struggle about having a coherent national broadband policy is that no one institution or one set of people has all the solutions. Our piece is infrastructure. The world counts on us to provide a clear and healthy regulatory environment for the investment and construction of the infrastructure on which all of this will be realized." Specifically, he continues, "We can look very critically at what costs we impose with regulation. We can look critically at whether there is enough benefit in the risk we are imposing."

Isn't that just code for further entrenching the monopolists? we push back. Powell is unfazed: "Remember, I'm an antitrust guy. I believe more in competition than half the guys who say they do."

If there aren't proper incentives for companies to deploy broadband, Powell argues, all these debates about competition will be moot. If anticompetitive effects show up in practice, the FCC can respond at that time. The only path we know isn't viable is the status quo. "Tell me what's working so brilliantly right now that we're all so comfortable will deliver on the promise?" he asks rhetorically. "We're talking about a very sick market."

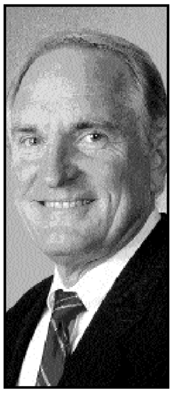
Powell hopes the technology industry will realize the importance of the issues before the FCC and become more engaged: "I think that, if they are concerned about the future of the communications sector, if that's genuine, they are a fresh voice of sorts. Whether they like it or not, their future is going to depend on being involved at a more particularized level." The events of September 11 only reinforced the importance of communications infrastructure, and of competition, he says. Without competing physical networks, damage to the dominant carrier would be devastating.

In the end, Powell says, "We have to recognize that things are always changing, and building rules on predictable assumptions is dangerous. The law is only as good as the assumptions that underlie it."

MONDAY, MARCH 25

INTERVIEW: Surveying the Landscape (ED)

Craig Barrett, Intel



Approaching three decades as ceo and in other positions at Intel, Craig Barrett is relatively unfazed by the recent carnage. “The communications market got twenty years of education in one,” he says. What was that education?

Basically, convergence, standardization... and basic economics. “What started happening to mainframes twenty years ago – the replacement of monolithic proprietary systems by interoperable, standard components – is now happening to Lucent and Nortel. That’s a great opportunity for us.” Of course, to Intel’s benefit, those new standard computer components are also proprietary; it’s just that almost everyone uses them anyway. If Barrett has his way, Intel silicon will underlie most communications gear of the future as well. Despite some recent hiccups, the company is set to benefit from most current trends – including some resumption in economic growth.

By investing during the downturn, Barrett hopes to bring Intel out stronger than ever. “You can’t come out of a slump with the last cycle’s products,” he says.

Intel is also a beneficiary and a promoter of internationalization – a word Barrett prefers to globalization: “Everyone – governments, business, the education establishment – they all realize the need for information for development. You need a certain basic infrastructure in place to attract investment, but then you have a hope of becoming a producer of value, not just a market for someone else. You want to be not just ‘made in Mexico’, but ultimately ‘designed in Mexico’.”

He adds, “We see a lot of opportunities to find design talent, especially in China, India and Russia. They had such a constrained hardware situation that they had to solve technical problems very creatively – and developed the kinds of skills that should be especially useful in designing communications systems that also operate in hardware constrained by mobility requirements.”

“There are two kinds of training – formal classroom training and programs, and our expectations, the way we work,” says Barrett. He recalls a certain Filipino plant manager who asked him to go easy on his workers; the manager took Barrett to a window to show him the slums where the workers lived. But Barrett, who has lived overseas for several of his 62 years and still travels widely, countered with experience from his local five-star hotel: “When a leaf begins to fall from a tree by the pool, someone runs out of the shadows to catch that leaf before it can hit the water. There’s no reason to lower your standards just because of where you live.” That particular plant manager got the message and spent many further productive years at Intel. In fact, Intel spends about eight percent of its payroll worldwide on training and education, including the odd scholarship for a promising employee to study at Stanford or MIT.

Yes, we got our own bananas

Overall, Barrett sees more opportunities for Intel to add value in emerging markets: “The regular OEMs – HP, Compaq, Dell and the like – don’t do as well there, so we have a stronger position with the local assemblers. It used to be that we’d introduce something to the OEMs, and they would incorporate it and finally cascade it out to the emerging markets a couple of years later. But now we’ve leveled the playing field between the major players and the emerging suppliers. These markets used to be a place to dispose of old inventory, but you can’t do that anymore. They don’t want the brown bananas; they want yellow bananas.”

Intel’s biggest problem, in fact, is where to grow. Says Barrett: “Over a decade ago, we were already at 80-percent market share, and we realized that the only way to grow was to grow the pie.” Part of that pie comes from emerging markets, and part from emerging technologies. Intel, with cash flow on the order of $10 billion per year, has two big spending categories: new plants for organic growth, and strategic investments including R&D: “Where we put our plants is strictly cost-benefit analysis... local decisions. Whereas investing in R&D and start-ups is strategic. The logic there is broader, more diffuse. We’re looking for technology, jazz, new excitement.” The market valuation of Intel’s portfolio has gone down recently, of course, and not all of its investments have turned out well. But, says Barrett, “Post Enron, our portfolio looks pretty good. It’s things you can go up and kiss.”

PANEL: The Politics of Enterprise Software (ED)

Enterprise software is like AI. It loses its visibility once it comes into widespread use. Enterprise software used to mean accounting; now it has shifted to more exotic applications, usually ending in "M" – CRM, SCM, and the like. But generally, it's data-based applications that allow enterprises to keep track of resources – revenues, employees, customers, payroll, partners, products, inventories. As companies get more complex, they need to keep track of those resources across multiple organizations, some of them even outside the enterprise's own walls. That's one reason for Web services, which ideally will allow for more seamless interchange – not just of data but of functionality – across different technical and business environments.

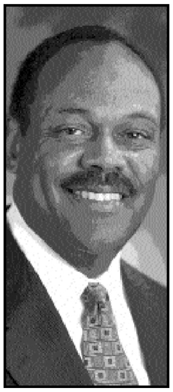
This sounds appealing, but right now customers are more focused on cost savings than on exotic new applications, and SAP gets more "cred" than the latest Web-services start-up. The interest in knowledge management and other "exotica" has abated; companies want to manage more familiar objects and cut their costs.

That has turned the enterprise marketplace into one of longer selling cycles and shorter projects. Corporations aren't buying anything that will take much longer than a couple of months to be implemented and show a return. Nor are they willing to buy from cute little start-ups on faith, the way they used to.... Moreover, much of the business is retrofit: Make these two systems work together. Put a new interface onto my old legacy ERP applications. Help me connect up to suppliers, but don't mess with my internal systems.

At the same time, failure rates are high – not because the software doesn't work, but because the people don't use it. And then the benefits aren't visible. You could say that this is the customer's problem, but it becomes the vendor's problem when the customers stop buying follow-on services and products. Even Web services aren't that easy; the data exchange may be seamless, but the data definitions and functionality need to be consistent across whatever systems are being linked. Note that the two smaller players on our panel – Wheelhouse and John Hagel – are more focused on implementation than on a particular new product or technology. They are selling not a dream, but the realization of the dream.

Yet anyone who has interacted with an airline – yes, even American! – a bank or almost any large enterprise knows that corporate systems still have a long way to go, whether it's customer-facing Websites or customer-facing people using internal employee-facing systems to serve their customers. Let's all hope that the vendors figure out how to make their customers more effective as well as more efficient!

Monte Ford, American Airlines – Flying on the frontier



Monte Ford, cio of American Airlines, says, "I came to American to do a start-up technology operation in a $22-billion company. My mission is cultural, procedural, and only partly technical. I was hired to reestablish our technology leadership and make it sustainable. American was known as an innovator, not just in airlines, but in databases, networks and transaction processing."

Ford started that process by insourcing functions crucial to the airline's core business, so he has a lot of experience with vendors... and advice for them: "I have to retrain our vendors," he says. "Most companies talk about, 'we wanna be your business partners and do everything to help American', and then they just try to sell their products. A lot of people want to ask me what keeps me up at night and expect me to spend an hour telling them. But I have 250 business problems. One of my biggest problems is how I spend my time. And spending an hour with each of them is not how I want to spend it!"

Instead, he advises, "They should seek out and talk to lower-level people who are dying to talk about their problems... and they know the answers. All I can tell them is: Learn our business and offer products or services that help us achieve our goals!"

But there's more: "There's a new model, what I call the broker model – ex-cios and industry people acting as aggregators for start-ups and entrepreneurs. I actually do talk to them, because they understand my world, and they help me pick out the new companies that actually have something useful for me in meeting my goals."

RFP: Small companies that think big

He concludes: "Those little companies often don't understand how to sell and service enterprise solutions. They want to come in and lead with the demo. They don't know how the enterprise works, or how their product fits in with the company's needs. That's less true of people that have worked on large accounts and government for years, or who come out of industry themselves." As Ford did: He began as a salesman for Digital, and then moved to senior vp posts at Bank of Boston and Associates First Capital before joining American.

Meanwhile, Ford is dealing with his own version of legacy systems: "Oracle and SAP are not all we buy from. For instance, we have bought from Plumtree, Vignette, Interwoven, ATG, Broadvision.... Going forward, we will buy fewer products and more external integration services. For a company like us, simplification is better."

But before it gets too painful, he acknowledges, "We won't get the innovation and entrepreneurial mentality by just doing stuff with big companies. We need small companies that think big. I've got 100,000 employees around the world.

"What we need is scalable innovation. Right now, my biggest challenge is to manage the convergence of security and convenience." For security and safety reasons, he can't say much more... but rest assured that there's a lot of opportunity for innovation in handling the requirements of airlines, governments... and even fliers!

[DISCLOSURE: ESTHER DYSON IS AN AMERICAN EXECUTIVE PLATINUM CARD-HOLDER WITH 5.96 MILLION LIFETIME MILES.]

John Hagel III, author – Balancing act

The last time John Hagel spoke at PC Forum (1997), he was a senior consultant at McKinsey and couldn't name his clients. Now he's a free agent and he has written a *Harvard Business Review* article mentioning three companies by name – GM, Dell and Merrill Lynch. But about actual *clients* – both on the customer and the vendor side – he maintains a discreet silence.

Since his first book on online communities, **NET GAIN** (distributed at the same Forum), Hagel has now moved back to where the money is – or at least where it is more visible! Although he still likes the community concept and thinks it will come into its own eventually, he's now more concerned with the practical support of communities within and around existing businesses.

In fact, you can't get more practical than his primary concern – enterprise ERP applications. Yet there is still a little magic to them. Just as client/server was heretical and disruptive in the late 80s, so is Web services now. And just like client/server (which is now so common that we rarely use the term), Web services are not an alternative to ERP nor even a better Web-based interface, but rather a better way of *implementing* ERP from inside.

Hagel is trying to ease his clients – both users and vendors – into Web services... at a pace that makes sense for each client. That's the *value* of a good consultant – the ability to know how to apply the buzz words and make them work in a specific situation. The overall rules will be available for a song in his next book, called **BALANCING ACT**, the product of a collaboration with John Seely Brown (Forum speaker 1994), about “the business implications of Web services and why business people should care,” Hagel says.

“What are the economics of adoption?” Hagel asks. “Right now customers are buying both ERP and Web services, the latter on a much smaller scale. In ERP, there are broad motivations. A lot of enterprises have huge incompatibilities across their data sets. They have systems that are incrementally enhanced over time, so corrupted and undocumented that the users just want some consistency. Second, the users often want to remove a major chunk of operating costs by integrating across functional silos. The bigger vendors are all expanding the scope of their offerings to provide that integration. No matter what we say about standards and APIs, with traditional technologies you’re better off getting everything from one vendor – both technically and just because you can get support from one place.

“But that’s a Faustian bargain. If I’m a senior manager and I want serious cost reduction, then do I compromise my ability to work with other parts of the enterprise or outside parties that are not using this vendor? You risk changing functional silos for enterprise silos. Moreover, that integration creates inflexibility. God forbid that the underlying enterprise has a need to change.

“Previously, there was no choice. But now, there’s Web services. It’s not clear how rapidly and with how much commitment ERP vendors will move into Web services. The prospect of losing near-term revenue is worse than losing longer-term revenues.”

The cost-reduction box

Nonetheless, he believes, “Web services will prevail, because of the enhanced flexibility they will provide. Businesses don’t want to cost-reduce themselves into a box... We’re advising clients to at least consider Web services options, even though it’s pretty early. The early implementations are kludged and highly pragmatic, combining Web services platforms and old technology to get results quickly.” He concludes: “If you commit to a new ERP system, you’re committing to massive organizational change. The reason most ERP implementations fail, is that most organizational change initiatives fail. It’s all about organizational change.”

As for himself, the books created a personal change. “I write books because it forces me to think clearly. Having to write ten chapters around a particular point of view makes you think in a more disciplined and insightful way. Second, it plugged me into networks of relationships that it would otherwise have taken longer to achieve. The whole process of writing books both made me and let me leave McKinsey.”

Frank Ingari, Wheelhouse – The five-percent solution

As everyone knows, more than half of all enterprise-solution implementations fail, one way or another. And as everyone also knows, the last five percent of any project seems to take most of the time and effort... to the extent that the five percent takes forever and the project never goes live.

Wheelhouse, the company Frank Ingari founded in mid-1999, is in the business of delivering the last five percent. Mostly, it implements projects using third-party CRM software from vendors such as SAP, Siebel, Oracle, atg, Vignette and E.piphany.

As longtime vp of marketing, general manager of spreadsheet development and finally czar of Notes/enterprise software marketing at Lotus (over years stretching from 1987 to 1993, with a year out to run a start-up, Ontos), Ingari comes to these problems from a customer perspective. "I understood the mix of transaction information and other data that needed to be presented to a salesperson," he says. "And I had the experience of trying to link together a host of incompatible systems, trying to build a salesforce automation tool within Lotus Notes. We needed to link to email, cell phones, whatever... and we only dreamed of being to able to communicate with actual customers with those same tools. We had to do what I call 'Karen Silkwood' marketing – feeling the customers through rubber gloves."

Moreover, as a marketer with some pretensions to technical expertise (no computer science background, but lots of R&D management), Ingari straddles two gulfs – one between marketers and salespeople, and another between vision-oriented brand marketing and tech-oriented direct marketing. He has also experienced the transition from PC shrinkwrap software – working with retailers and with distributors such as Ingram, MicroD, et al – to enterprise software. "I helped develop the core positioning and support system for Notes as the groupware standard, and helped move the sales force from retail channel-stuffing to enterprise pull. I learned how the power of the B2C model and the power of the direct-sales model could converge in the network," he adds in his best marketing jargon.

Switching easily to fluent tech-speak, he continues: "Ten years later, at Shiva, it was possible to do what marketers had always wanted but could never do before. You could put up a terabyte of data into a relational database and munch it around. You could invest in the brains of an analytic datamart because you had the arms and limbs of a Website, an SFA [sales-force automation] system, and a call center."

Having left Shiva (when it was sold to Intel), Ingari started GrowthAlly, serving start-ups with advice and wisdom. "All my customers had this need. Security Dynamics (now RSA), Allaire, Resort Sports Network: They all needed to coordinate their information sources to do better product design, sales, marketing, and service. Meanwhile, the enterprise software model was coming apart. The entrenched players were being rewarded for selling licenses, and leaving behind consulting work for the Big Five to implement."

So, he says, "Wheelhouse invested in software that makes CRM work. We started work on tools that could manage E.piphany and Siebel, etc., in the real world, connect them, fine-tune them. So far, we have invested fifty man-years. But we also started immediately with revenue-generating professional services and a hosting center. All that experience we have poured back into our own software, but what we *sell* is the results we get."

Data washing and pressing

How much of that last five percent is automatable? we ask. "It's about 60 percent license and 40 percent services. The first piece we're shipping lets you define and map front-office business definitions across legacy systems, analytics systems like E.piphany, and operational systems like Siebel. What does a 'response' mean? Is it any response, or a specific query about the specific product? It's very simple in concept, but incredibly complex when you scale up"

Wheelhouse does all this following Web services conventions, so some day its customers – companies such as the Washington Post, Mazda, Cadence, Wells Fargo, Merrill Lynch and Putnam – may even be able to talk across their own corporate boundaries. Meanwhile, Wheelhouse's revenues are now just a fraction of the license price of the software it manages, but before long it should be able to raise its share of customer spending well above five percent.

Henning Kagermann, SAP – A vision of execution

"Customers don't want a new vision every year," says Henning Kagermann, co-chairman and co-ceo of SAP. "They want software that works." That has long been the specialty of SAP, which Kagermann joined in 1982 straight out of university. Over the 20 years since, the Walldorf (near Heidelberg), Germany-based company has grown from 105 to 28,000 people, and Kagermann has risen from a developer in Financials to his current position with a focus on sales, consulting and management of customer and partner relationships; his counterpart Hasso Plattner focuses on strategy, technology, marketing and communications.

"If customers don't talk much about their relationships with us, it is because they are pretty good. They feel comfortable talking with us about everything from lessons learned with their IT projects to their strategic visions and what they expect from SAP in the future. Sometimes they complain about some minor issues, but this only shows that they already trust us with the big things," says Kagermann.

SAP is now in a comfortable position, but Kagermann is careful to avoid complacency. "Yes, the behavior of clients has changed. They are coming back to a one-vendor strategy. As long as the prices are generally fair, they're happy with one key vendor. Some of them buy 20 percent elsewhere just to keep us honest, we know!"

But even SAP went a little too far in the euphoria of the last couple of years, Kagermann admits delicately. "We had thousands of partners, but in the end we had too much diversity on the quality side. Now we're focusing our key resources on a smaller number of partners. We're forming tighter alliances with the most important ones, specifying where we overlap and where we compete, defining territories. The partner has to believe we're not going to push him out."

With only 20 percent of its sales volume in its German home base and 28 percent in the US, SAP has a strong appreciation of the world's extent. "We see good opportunities in Sweden and Russia." He adds, "That just shows how strong we are, that we can look at places like that. We're also increasingly active in Japan and China. By industry, we see growth in retail and banking."

But SAP recognizes that it needs new products and functionality in addition to geography. "We run into a lot of innovative companies all over the world," says Kagermann, "but we handle technology partnerships out of strategic marketing in New York. There's too much internal competition to do that effectively from within the development organization."

"We've got to fight more strongly against Siebel," he continues forthrightly. "We need to give people better access to customer data. We're doing that in two ways. First, we'll have an end-user portal that integrates from the user out, giving them access to all kinds of data, not just SAP data."

Bi-lingual

"Longer-term, we'll do increased integration of processes end-to-end, using Web services. We speak not just German and English," he says proudly, "but also Java and ABAP [SAP's own fourth-generation language]."

The company also plans to broaden its market reach: "At the high end, we go for share of wallet, trying to get not just the central enterprise, but also its branches and partners. At the low end, we'll go for market share." How will the company do that, given its focus on large-enterprise systems? "Something like Intuit," he muses. "That might make sense." But that's not an announcement – just an indication of an open mind, he stresses.

He's also interested in the idea of ASPs – but not sure it will make sense culturally for some time. "Even in a kindergarten," he says, " you can see that it's human nature to want things of your own. Kids start with – call it universal access – to toys, but pretty soon they are grabbing the toys and holding onto them."

PANEL: Turning Media & Entertainment Upside Down (KW)

The idea that computers, the Net and digital media will transform entertainment is nothing new. Thanks to Napster, neither is the notion that these same technologies threaten the business model of the established entertainment industry. Lacking have been realistic visions for putting Humpty Dumpty back together again. What are the business models and technologies that will allow everyone in the chain – content creators, distributors, network operators, hardware vendors and others – to recoup their investments, while producing at the end of the process a diversity of things that the audience actually wants?

The basic issue is the disconnect between content-driven industries based on one-way, one-to-many broadcasting with well-defined boundaries, and the new world of many-to-many connections with intelligence spread throughout an interconnected network. The business of media has traditionally depended on control over scarce resources. The devices through which consumers currently experience media and entertainment only reinforce this bounded environment.

What changes when the audience can shape and control its entertainment experiences, both individually and through communities? What has TiVo learned in three years of *selling a device that gives users that kind of control? Will new entrants such as Moxi take the convergence of entertainment and computing to a new level? Is there a future for Napster based on licensed content? And just what is the argument that convinces media companies terrified of piracy and loss of control to make their content available?*

JC Herz, Joystick Nation – Games without frontiers

JC Herz was writing about the social dimensions of the online world before it was cool. Her first book, **SURFING ON THE INTERNET**, came out in 1994, a year after she graduated from Harvard and just as the first commercial Web browsers hit the scene. Her second book, 1997's **JOYSTICK NATION**, looked at the history and evolution of video games, showing how they shaped the minds of the first digital generation. She now combines the two interests with a business focus. In her consulting work, she helps companies take advantage of the power of networks as they develop systems, services and brands.

"I come from games, where everything is many-to-many. Everything on the Web looks impoverished to me," says Herz. Most Websites provide one-way information delivery to a single user. By contrast, games sites such as Gamespot have for years matched interested players across the Web, and massive multi-player games such as Everquest and Ultima Online draw hundreds of thousands of users into shared online worlds.

Sony has 410,000 paying subscribers for EverQuest, generating recurring revenue of $3.6 million per month for a service that took less than $10 million to develop. The Web-services model in which software components interact over the network using standard interfaces (SEE **RELEASE 1.0**, SEPTEMBER AND OCTOBER 2001) is, to Herz, just the business world catching up to where the game industry already is.

Herz dismisses much of the activity during the dotcom boom: "The hype was confused with innovation. I think in the majority of cases, these business plans that were put forward were not innovative at all. It was just 'fill-in-the-blank.com'. Despite the rhetoric about radical innovation, there was no original thought."

When it comes to online media, Herz sees a similar lack of innovation. Sending streaming video over broadband connections, she says, is just an extension of the basic 20th-century model of controlled content distribution.

Media as a service

Herz envisions a more profound shift in the nature of the media business, driven by the failure of traditional models and the success of new approaches in the gaming world and elsewhere. "Media experiences really become services rather than products," she explains.

As a side effect, that change will address the intellectual property and business-model issues that bedevil online media and entertainment efforts today. "It shifts to a situation where value is bound up in the instantiation of the network, rather than the specific information that is traveling on it," she argues. AOL can give away disks with its software client because what users pay for is the ongoing experience, not use of a physical product.

The brave new world of media as a service does create complications for those used to the old model. "The 20th-century media model is predicated on scarcity to some degree – not many places to consume media – and on the concentration of capability – not many people who know how to produce media. Neither of those conditions applies in a networked society," says Herz. Instead of leveraging scarcity, she continues, networked media must leverage social networks. Value in an interactive environment comes from generating and exchanging social capital, rather than sitting back and absorbing a strictly defined piece of programming.

In some ways, this idea has been around in other contexts. Herz points to *Star Wars*, the Harry Potter books and Merchant-Ivory period movies as examples of traditional media properties that go beyond products to create entire worlds for their fans to explore. It's as if they have another dimension, offering ongoing activity that draws the audience in. Programs such as *The Sopranos* and successful reality TV series such as *Survivor* owe their success to this dimensionality, Herz says. They have become franchises because they have their own rules and internal structures, which give viewers something to talk about and feel part of.

The trick is to build content with that level of depth. And that's a matter of design principles. "All of this reality TV is game design," says Herz. "You set up the rules, put it together... and see what happens!"

Konrad Hilbers, Napster – Beyond free

For someone who spent the past ten years at a multi-national media conglomerate, Konrad Hilbers fits in surprisingly well at a Silicon Valley startup. “I’m wearing khaki trousers right now and a black Intel-branded T-shirt,” he points out over the phone. “Part of my decision to join Napster is that I personally fit better in a startup and high-growth situation.”

Hilbers left Bertelsmann subsidiary BMG Entertainment, where he was chief administrative officer, to become ceo of Napster last July. Originally from Germany, he first joined Bertelsmann in 1992 and served as an executive at various affiliates and joint ventures including AOL Europe and CompuServe Europe.

Bertelsmann’s involvement with Napster goes back to October 2000, when the giant signed a strategic alliance with the peer-to-peer music-sharing startup and lent it several million dollars. Hilbers has a close relationship with Bertelsmann ceo Thomas Middelhoff, and his installation as Napster ceo is further evidence of Bertelsmann’s ongoing commitment to the company. Hilbers emphasizes, though, that Napster is independent, and that he personally has no contractual relationship with Bertelsmann.

Napster shut down its free service and is still in litigation with the major record labels, but it has gradually made progress in transforming itself into a licensed distribution channel. In September it reached an agreement in principle with the major music publishing organizations. It is now negotiating with the labels for licenses to their catalogs. Hilbers says none of the labels has yet offered a deal that makes business sense for Napster, but he is optimistic that agreements can be struck.

This is not the outlaw Napster of old. “Copyrights were established in US and other markets with good reasons. One of the most important is to protect the rights of the creators and to remunerate them for their work,” Hilbers says. “The content that is copyright-protected is not falling out of the sky from someone singing in the shower,” he continues, it’s coming from artists trying to make a living. “There is no question about the willingness of the whole legislative side, even the consumer side, that in the mid- to long-term, copyright needs to be respected and the artists need to remunerated,” he asserts.

Hilbers argues vigorously that Napster’s popularity was based on more than the ability to download copyrighted music without paying for it. “Napster is not about free. It is about finding music; it is about community; it is about actions around music,” he says. Napster's peer-to-peer architecture fostered a community that shared its views and its tastes with one another, and that will continue in the licensed service.

To capitalize on Napster's remarkable 96-percent brand awareness around the world, Hilbers says, "We'll work hard to offer what Napster was known for. We can't be free, but we want to offer attractive pricing that makes it bearable for consumers."

Even with licensed content, Hilbers believes, Internet distribution will have a significant effect on the music business. Today, the major labels actively distribute only a tiny fraction of the music recorded. "They have certain thresholds that will probably be continuing at the same level, because it takes certain investments to put albums into US and worldwide distribution channels for physical distribution," Hilbers explains. By reducing distribution costs and offering new search and discovery mechanisms, Napster will overcome this limitation, he believes: "I think we will have a totally new segment of music that gets its chance even before it hits the radar screen of major labels."

To get there, Napster will have to avoid disappointing a big enough fraction of its previous vast but non-paying user base. Promises Hilbers, "We will not allow ourselves to become just one of a set of commercial distribution vehicles that are more interested in the short-term exploitation of rights than in the long-term build-up of consumer relationships."

Steve Perlman, Moxi Digital – Moxi man

Steve Perlman has been involved with six "creative" technology companies – Apple, General Magic, Catapult Entertainment, WebTV, Microsoft and most recently Moxi. But to hear him tell it, he has been doing the same thing all along: "No matter how long it takes, I'm just determined to create, if you will, the next TV: the next form of mass-market home entertainment."

Getting there, Perlman admits, is a tortuous process. WebTV, which Perlman founded in 1995 and stayed with for two years following its absorption into Microsoft, was a first effort to bring the interactivity of computing to bear on TV. Says Perlman, "The next step was to create a nexus for all media in your home, where there's also a server and a router." And Microsoft, with its PC-centric focus, wasn't the best place to do it: "The very wonderful thing about the PC, that it is so flexible, is exactly the reason that it's not right for this function." The PC can't deliver the realtime functionality, reliability and security needed for a home media server.

Perlman believes the broadcast paradigm is failing. "As our society has evolved, our interests have become more diverse, more narrowcast if you will," he explains. "The Internet has only accelerated that. When it comes to TV programming, the current technology doesn't suit itself well for that kind of content." The History Channel runs infomercials part of the day to fill up its time, yet Civil War buffs must wait weeks until a program shows up that matches their interests.

TV also forces viewers to adapt to its time-based channel grid. Notes Perlman: "People are busier today. We're not part of the average family of the 1950s that sits down and watches TV from 7 pm to 11 pm. We just want to get what we want, when we want it."

The real convergence deal

And then there's the much-promised "C" word – convergence. Video has been integral to popular music ever since MTV launched 20 years ago, Perlman points out, yet there is no easy way to link up audio on a CD with a music video on cable. The media experience is modal, with CD players, VCRs, DVD players, TV sets and even new devices such as personal video recorders each offering its own experience.

With the creation of Moxi, Perlman believes many of these issues can be addressed. "People have been talking about convergence for years, but until we introduced Moxi at the Consumer Electronics Show in January, I don't think people had ever seen convergence before," he says.

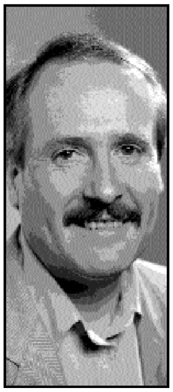
Moxi's Media Center integrates a tuner, digital music jukebox, digital video recorder, DVD player and broadband gateway into a single appliance. It offers a media-centric browser experience: Users request what they want, and the device locates it, aggregates it and delivers it regardless of format or original distribution. Oh, and did we mention the built-in 72-megabit 802.11a wireless connection that can stream high-quality video and other content to TVs throughout your house?

Moxi's device includes rights-management features to prevent content from being distributed in violation of copyright. But that's only the defensive side of the coin. Think of all the people, Perlman urges, who might purchase a soundtrack as an impulse buy after watching a movie, or who would click to watch the video when listening to the songs, or who would want to pull the music directly into their portable MP3 player to play while they jog. Those capabilities will sell more product and create new revenue opportunities for content owners and distributors, he says.

Perlman recently stepped down as ceo of Moxi, although he remains on the board as vice-chairman, to focus more time on a parallel project: a 3D animation production studio called Rearden Steel Studios. Perlman believes that if he can bring down the costs of motion-capture systems from the current hundreds of thousands of dollars to a few thousand dollars, it will open up significant possibilities for new content.

Already, digital video systems eliminate the massive expenses of film-based production. Cheap lifelike 3D animation would reduce the costs of high-quality content further by replacing actors and sets, creating opportunities ranging from independent films to educational videos. It's a tall order, but Perlman is sticking to the path he's followed all along.

Mike Ramsay, TiVo – Silicon Valley meets consumer electronics



TiVo makes the leading personal video recorder (PVR), which allows users to select and record TV content digitally, and to pause or rewind TV programming as they watch it. In three years on the market, TiVo the company has sold some 400,000 devices through OEMs such as Philips and Sony. Virtually everyone who has a TiVo loves it. *[Present company included. –KW]*

If this were a computer trade publication, we might call TiVo a Linux-based server appliance that stores rich media on a hard drive, with a Macromedia Flash user interface based on program-guide metadata downloaded through a built-in dial-up modem. But you won't ever hear TiVo ceo Mike Ramsay describe it in those terms.

"Trying to be successful in home entertainment is very different from trying to be successful in computers," he says. "We hide the technology as much as possible."

Not that Ramsay himself is uncomfortable in the technology world. Before co-founding TiVo he spent several years as an executive at Silicon Graphics, and prior to that at HP. At SGI, he saw firsthand how computer technology could be applied to entertainment, in the form of special effects for movies. With Hollywood, Ramsay recalls, "There was this mutual admiration thing going on. They couldn't understand the technology, but were in awe of what it could do for them. We couldn't understand the movie business, but we were in awe of their ability to create what consumers wanted."

Ramsay sees TiVo as the foundation for a similarly fertile cross-pollination between entertainment and computing in the home. It hasn't been easy. "In many ways, we took a technology that was too damned expensive, and we bludgeoned it into the market two to three years ahead of its time," Ramsay admits. Fortunately, since it uses commodity components, TiVo benefits from Moore's Law and the resulting cost declines over time.

When TiVo and competitor ReplayTV first launched, there were predictions that, by giving users control over what they watched (and didn't watch), these devices would destroy the economics of the TV industry. Ramsay doesn't see it that way. TiVo works with established media companies, many of which are its investors, to create new opportunities with its platform. TiVo's hard drive and flexible interface allow content owners and advertisers to deliver previews of upcoming shows, targeted promotional offerings and other material that could generate new revenue streams.

I know what you watched last Sunday

TiVo also sells aggregate data about user behavior. During this year's Superbowl, it found that users spent more time rewinding and re-watching some of the commercials than the action during the game. That's the kind of information advertisers crave. (TiVo doesn't release any individual data, and its privacy policy has been reviewed by the Federal Trade Commission.)

All of this makes TiVo an interesting business. "We haven't ever recognized any revenue from boxes, despite the fact that it's a $100 million business," notes Ramsay. TiVo sees its hardware and software development work as a necessary investment whose expenses can be recouped through licensing agreements. Its real business is subscription fees, promotional dollars from advertisers or content companies and sales of aggregate audience data.

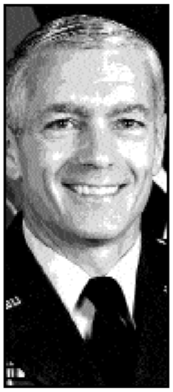
"We're sort of a combination of AOL and Gemstar," Ramsay says. (Gemstar owns *TV Guide* and has a lucrative business licensing its patents for electronic program guide technology.) TiVo isn't profitable yet, but it has positive gross margins on the non-hardware side of the business.

TiVo exemplifies the cultural issues that arise as computing and media meet. "We're living through a period where the center of innovation in the consumer-electronics industry is moving from Japan to Silicon Valley," says Ramsay. Sony recently signed a licensing agreement to incorporate TiVo's software across its product line.

As entertainment moves from analog to digital, Ramsay predicts, the computer industry model will win over proprietary closed systems, so long as companies design products and interfaces that meet customer needs. This shift also helps TiVo recruit good employees. Notes Ramsay, "At the end of the day, they can take the thing home, and their families understand what they're working on... which is unique for Silicon Valley."

DINNER SPEECH: War at Home and Abroad

General Wesley Clark, US Army (ret.)



What's on General Clark's mind? Not the easy metaphors about "business is war," but war itself. His book, **WAGING MODERN WAR**, describes his experiences in the Balkans as NATO Supreme Allied Commander of Europe. As he tells it, political conflicts at home and in the Pentagon were more difficult than working with the NATO allies. But it was the first NATO war, and with political dissension at home, military squabbling and Allied concerns, the conflict looked much messier than it should have.

As a warrior, Clark waged war. As a civilian, he's trying to figure out how to build the kind of society he was fighting for – both in the US and in places such as the Balkans and Afghanistan.

"We need to get our allies involved and engaged overseas." First, he says, we need to understand, "How did we get here? We didn't have a strategy for a decade. With the end of the Cold War, we lost our adversary and we lost our sense of purpose. The only thing the Republicans and Democrats agreed on was to spend less on defense.

"Yet, by the time I took off my uniform in summer 2000, we were the most powerful country in 500 years. But we had also incurred some stark vulnerabilities. Now we need to finish Al Qaeda, support those within Islam who want to modernize the practice of that religion, and 'drain the swamp.' But we're not attacking the 'axis of evil.' In the developing world there are a lot of people who believe they're poor because we're wealthy. We need to help them develop effective governments with a respect for freedom, educational systems, and a good economy to support all that."

Misguided missiles

But, he says, our way of waging war is fraught with difficulties. "You can't fire missiles at people without knowing who they are. We've got to take greater risks with our own people to get the information we need. The troops are only moving out in strike patrols. We don't speak the languages; we don't know how to trust the locals.

This is a very tough situation. To the Afghan, we're like aliens that come out of starships and kill people with alien technology. They don't even see our faces. In the long run, this won't work."

At home too, he's busy and engaged – as a newly minted venture capitalist at Stephens Group, a director of several companies, and a CNN commentator. As a new director of Axciom, one of the largest managers of personal data (mostly on behalf of financial-services companies), he's intrigued by the potential of large-scale databases – and concerned about the privacy-security trade-offs. "There are two schools of thought," he says. "One school says, 'You can take an X-ray of me naked as long as I'm anonymous'. The other school says, 'I'll tell you anything, but don't mess with my body'." And then there are those who resist both....

Overall, he finds he has come back to a changed world. "What kind of country do we want to live in? There will be more community; the anonymity of urban life will be peeled back a bit. It's a new way of life" – or a very old one. "When you got off a train at Penn Station in New York, people used to look at you as if you were a soccer player on the opposing team – looking at your belly button, searching for the soft spot. Now, after 9/11, they're looking at faces – asking, 'Are we with friends? Will these people support us?' Nowadays, I'm usually greeted by name by pilots. They're looking at the passenger lists. They want to be alive, too. That first reaction towards community is the best indicator of where the US wants to go and where it will go."

But what about the rugged individualist on the frontier? we ask. What about privacy? "There's always a need for courage, resolution, independent action. We are those rugged individualists and we know who we are." But, he adds, "A nation of 250 million has to establish that community through technology."

TUESDAY, MARCH 26

INTERVIEW: Laying the Tracks (KW)

Joe Nacchio, Qwest Communications

When Joe Nacchio says, "I probably have as good a perspective on this as anyone else, because I've been on so many sides of the industry," he's not kidding. He has run a major long-distance business, a data-centric startup, a huge local phone company, a large Web hosting operation and a broadband powerhouse. The funny part is that he has worked for only two companies during his adult life. Nacchio spent 26 years at AT&T, rising to become head of consumer operations. Passed over as a possible successor to then-ceo Bob Allen, he left AT&T in early 1997 to take the helm of Qwest Communications.

Tycoon Philip Anschutz created Qwest based on the right-of-way he owned alongside the Southern Pacific Railroad. His goal was to build the world's most high-capacity fiber-optic network – a plan whose audacity suited Nacchio just fine.

As Qwest completed its network build-out and went public, it quickly jumped from startup to major player in the telecom world. In moves that were criticized at the time but look shrewd in hindsight, Nacchio used Qwest's high-flying stock to buy long-distance operator LCI and then US West, one of the seven regional Bell operating companies (RBOCs) formed after the breakup of AT&T.

"I think when people look at us, they think of us as one of those post-Internet upstarts," says Nacchio. "They fail to remember we're the fourth-largest local telephone company in the country, in addition to having these great long-haul assets." Eighty percent of Qwest's revenue and 90 percent of its cashflow come from US West and its 25 million local service customers in 14 states.

Nacchio believes that Qwest's combination of assets is a strength, because areas such as long distance and Web hosting are not naturally viable businesses on their own. In the short term, he acknowledges, not being a pure-play in any market may hurt Qwest in the eyes of Wall Street. Qwest's stock and ability to raise capital haven't been immune from the industry-wide downturn, especially after competitor Global Crossing went bankrupt, raising concerns about Qwest's accounting practices.

Though he rails at his company's current difficulty borrowing money in the commercial paper markets, Nacchio is confident he has the right long-term strategy. "We look like the collection of assets that other companies in this industry will eventually become," he says.

The proper stimulus of capital

After Wall Street, what most concerns Nacchio is government policy. "I think national policy in this country has evolved in recognition of the importance of this industry to our national economy, and to the way we live and work," he acknowledges. Beyond that, though, he believes that, "It's now time to reassess some old embedded assumptions about this industry in light of what's gone on in the last few years. I think what this country is starved for right now is the proper stimulus of capital."

Under the heading of "capital-formation-friendly policies," Nacchio puts actions such as the FCC's proposal to treat DSL as an unregulated information service, not subject to resale requirements, and the pending Tauzin-Dingell legislation deregulating the Bell companies' long-distance data offerings. If they can't capture the rewards, Nacchio argues, how can companies such as Qwest be expected to take the risk of deploying broadband services?

But, we protest, didn't the Internet take off because a "stupid network" in the middle left room for innovation at the edges?

"The Internet succeeded because you had cross-subsidies from telecom to the Internet," Nacchio fires back. "Let's not let anybody kid anybody." The FCC's policies on access charges and reciprocal compensation, he says, gave ISPs an artificial advantage. Nacchio believes that this time around, telcos will need freedom to deploy capital and control their assets if broadband is to take off.

Nacchio sees the current financial and regulatory travails of the telecom industry in a broader context: "I think access to broadband is the Marshall Plan that this economy needs to provide another ten years – as we had in the 90s – of a strong economy." Along those lines, he emphasizes, "This isn't about whether Qwest does better; this is about whether the US does better."

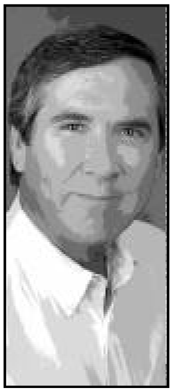
PANEL: Overcoming the Broadband Bottleneck (KW)

It feels as though we've been talking about broadband forever. Yet the one thing everyone – end-users, enterprises, telcos, equipment vendors and network service providers – can agree on is that something still isn't working. First, the good news. According to FCC data, more than 10 million US households have high-speed Internet connections, and businesses have significantly greater and cheaper options than they did five years ago. The bad news is that deployment has slowed, many service providers have gone under, prices are too high and everyone claims to be losing money. Is there a way out?

The local phone companies selling DSL and the cable companies selling cable modem services aren't necessarily the only options. EarthLink doesn't own a local network, but it offers broadband over phone lines, cable and satellite, and is examining wireless options. Yipes is reshaping the economics of business connectivity with its metro-area Ethernet-based networks. Broadwing is showing that a local phone company can be a nimble broadband competitor. And Cisco is knocking on doors in Washington, urging a national broadband policy, while watching to see where demand will come from.

Government regulation isn't the only factor shaping the market (though it certainly is one of them). How will new technologies such as optical networking change the infrastructure landscape? What will the impacts be on pricing models and applications? And will the capital markets ever again fund a new data-oriented service provider? Given how central high-speed connectivity is to the next phase of Internet development, these are not idle questions.

Garry Betty, EarthLink – The independent



EarthLink is the little ISP that could. Only today, with 4.8 million total subscribers and over 470,000 broadband customers, it's not exactly little.

"I've been doing this for a long time now," says ceo Garry Betty. "I can't tell you how many times over the last six years, pundits have told us that we would never be successful." There was always a competitor that was bound to crush independent EarthLink. First it was big long-distance companies such as AT&T and MCI, then it was AOL, then it was free ISPs and now it's cable companies and local phone companies offering broadband over the facilities they control.

EarthLink is still around. Two years ago, it merged with competitor Mindspring, and it has steadily scooped up the accounts of smaller failing ISPs and wireless service providers. It's now the third-largest dialup ISP, behind AOL and MSN, and it's moving aggressively into broadband. As a pure-play ISP, EarthLink has only one business to concentrate on. Betty points out that, of 13 EarthLink senior executives, nine have been with the company for more than five years. And in a dig at AOL, he notes, "Our primary objective is to give you a great user experience from an access point of view. It's not a hunting license to sell you everything in the world."

But can the company make money as a pure connectivity provider? Betty says EarthLink will hit cashflow breakeven this year, and he's confident that there's a business in selling broadband without subsidies from content or applications: "We're going to show that we can be very profitable just providing access." At the same time, Betty looks forward to the day when EarthLink has enough broadband subscribers to attract major content owners to deliver value-added rich media to its customers.

By any means necessary

EarthLink is agnostic about how it delivers broadband. It partners with telcos, DSL wholesalers such as Covad, cable operators and satellite providers for its broadband offerings, and it's also exploring wireless possibilities. "I believe consumer choice is a good thing," Betty notes. "If you call a telco, they try to sell you DSL. If you call a cable company, they sell you cable. Most of the growth in the broadband business in particular over the last four to five years has been based on availability, not based on consumer choice."

For DSL, phone companies are required to provide competitors with access to their networks. On the cable side, the US government has declined to mandate such "open access" (SEE **RELEASE 1.0**, FEBRUARY 1999). However, cable companies are starting to realize that allowing companies such as EarthLink onto their networks, for a fee, is a good business strategy. EarthLink now has such an arrangement with Time Warner Cable operating in three markets, and the two companies combined sign up more subscribers than Time Warner did alone in those cities. Betty is convinced that other cable operators will open their networks voluntarily, because it makes good business sense, though the broadband market would be bigger today had they done so earlier.

The big issue for broadband, Betty believes, is price. At $40 to $50 per month, existing cable modem and DSL offerings are just too expensive for the bulk of the market. EarthLink has done surveys of its dialup customers that track what other studies have shown. Says Betty, "For our users, it's binary. At $30 per month, I could move well over half my customers to broadband. At $25 per month I could move all of our customers to broadband. At $50, it's going to hit 30 percent, and we'll stagnate."

Rick Ellenberger, Broadwing – The very model of a modern telco

"I'm not a guy who worries about commoditization," says Broadwing ceo Rick Ellenberger. While many players in communications today see downward price pressure as a new phenomenon, Ellenberger has been there before. His first job in the industry was building the business-services sales operation for MCI, which was then an upstart challenging the mighty AT&T. In 1979, he won MCI's first big account – Aetna – by lowering its long-distance rates from $2.12 to $1.43 per minute. Those were the days....

Broadwing was created two years ago from the merger of Cincinnati Bell, one of the largest independent local telephone companies, with the national long-haul fiber network of IXC Communications. It has been an eventful time. "When we formed Broadwing, we had about 15 competitors with better-known names and rock-star ceos," recalls Ellenberger. "Two years later, there are very few competitors and even fewer rock stars in this industry."

Ellenberger feels Broadwing is well-positioned, despite the industry-wide slump, because of its combination of assets and its nationwide optically switched network. "In the telecom world, there aren't that many product differentiators," Ellenberger notes. Broadwing can deliver individual wavelengths of light (known as lambdas), which carriers and large enterprises can use to assemble their own high-speed networks quickly and cost-effectively.

Broadwing is also one of the few companies that actively bundles local and long-distance service, because it owns both components in the Cincinnati area. Cincinnati has the highest per-capita DSL penetration in the country. "We think because we're deployed here, we're getting to see some of the higher-bandwidth applications that will be rolled out to the rest of the country in the future," Ellenberger notes.

Ellenberger points out that although Broadwing offered DSL in Cincinnati for 18 months before Time Warner launched its Roadrunner cable modem offering there, both companies have benefited from the competition since Time Warner entered. Having more than one high-speed access provider creates positive buzz and forces the providers to deliver applications that increase demand. "We had to be able to offer tangible benefits," Ellenberger notes. "If you hadn't experienced the faster Internet, why would you pay another 10 to 30 dollars a month for it?"

From soap to broadband

As the home of Procter & Gamble, among other reasons, Cincinnati has historically been the venue for test-marketing products and services before they are rolled out nationwide. Broadwing takes advantage of this fact, partnering with companies such as Intertainer to deliver video-on-demand and other new services. "We have an opportunity to try out these applications and deploy them far sooner than everyone else," says Ellenberger.

In the current debates about broadband policy, Ellenberger favors what he considers a balanced approach. He agrees that it's important for consumers to have choices among providers, but he also believes some deregulation of the Bell companies would hasten broadband availability. "I think the reason those companies are slow to deploy is that they are not getting the revenue benefit at the other end," he says. As an independent, Broadwing isn't subject to the same restrictions, which Ellenberger points to as a reason for the company's intensive broadband activities.

In thinking about how the Net will develop, Ellenberger turns to his own experience. His teenage kids already see the Net primarily as a visual rather than textual medium. And Xavier University, where he sits on the board, recently upgraded to a DS3 (45 megabits per second) connection for its dormitories. "In 1995, that was the access capacity of Worldcom's backbone through Cincinnati," Ellenberger points out.

Ellenberger reaffirms his faith in his company's unique opportunity. It's the only carrier other than Qwest with a strong footprint in both local telephone service and long-haul data, and it was the first to deploy an all-optical switched national network. But Ellenberger doesn't expect to be alone for long. "I think many of the RBOCs and long-distance players are keeping a very close eye on how we are progressing," he says.

Jerry Parrick, Yipes Communications – The disruptor

Jerry Parrick knows how the Bell companies think. After all, he spent some 30 years of his career at two of them, running the data-networking units of US West and Pacific Bell. He also ran Diamond Lane Communications, a DSL hardware vendor, which was sold to Nokia. Now that he's on the independent side of the industry, Parrick is worried about what the Bells will do if competitors continue to die out. "There's a number of us who are extremely concerned that the new FCC is retreating from its commitment to competition," he says.

The collapse of most competitive local exchange carriers (CLECs) was, Parrick believes, a largely predictable shakeout. There were simply too many companies chasing the same customers with the same technology... and then the capital markets pulled the plug on financing.

But to Parrick, the notion that the telecom collapse justifies deregulation of incumbents is backwards: "This is not the time to just assume [the competitors'] demise and think we'll be left with a bunch of RBOCs. The RBOCs won't respond with new services and they won't spend money if they don't have to. They would just as soon offer legacy services. The only thing that prompts them to innovate is competition."

At Yipes, which he co-founded, Parrick has the luxury of not depending on local telephone company infrastructure. Yipes has built metropolitan-area optical networks using dark fiber leased from "carriers' carriers" such as Level 3 and Metromedia Fiber Network, as well as utilities and cities that have put their own fiber in the ground. Yipes extends the fiber directly into office buildings and campuses on its own facilities, unlike CLECs which have to lease access to "last-mile" facilities owned by telcos. Yipes, founded in July 1999, now serves 600 customers in 21 local markets across the US, including the Chicago Stock Exchange and the University of Pennsylvania.

"What we've essentially done is taken gigabit Ethernet out of local-area networking and put it into metropolitan-area networking," explains Parrick. Instead of using traditional telecom technologies to link together corporate networks or to connect corporations to the Internet, Yipes uses Ethernet, which cuts out roughly 90 percent of the equipment costs.

Says Parrick, "It's disruptively cost-effective... and that leads to a disruptive price." Yipes, he says, offers double the bandwidth of traditional options, at a lower overall cost of ownership.

Bandwidth on demand

Yipes is disruptive in another way. Traditionally, data-networking services have been sold in fixed increments, such as 1.5-megabit T1 lines and 45-megabit DS3 circuits. But few companies' needs track those ranges exactly. Yipes allows customers to scale bandwidth up and down in one-megabit increments, from T1 speeds all the way up to a gigabit. Customers can see their network utilization and performance through a Web-based interface, and move a simple slider up or down to request more or less bandwidth. Yipes sends a price quote, and if the company wants to go forward, the network reconfigures for the new capacity in less than two minutes.

What about the glut of fiber capacity that is putting pressure on so many fiber networks? we ask. “Glut talk needs to get more specific,” Parrick responds. “I think everyone agrees there’s a glut in the wide area. Too many companies put too much fiber in too many places. That’s not true in the metro area.” Metro-area connectivity remains dominated by the incumbents whose technology, Parrick says, gives them inherently higher costs and less flexibility than Yipes.

Building this kind of business still requires significant capital. Yipes, which is still private, has raised a healthy $291 million in three funding rounds, led by Norwest and New Enterprise Associates. But Parrick still sees access to capital as the central issue for success of his business: “The venture-capital community is skittish. This is both a curse and a blessing. These are capital-intensive businesses, and it makes raising money difficult. The good part is that raising money is difficult, so we don’t have a whole bunch of people being funded to chase us.”

Mike Volpi, Cisco Systems – Time to focus

Mike Volpi joined Cisco in 1994, just as the Internet boom began. What was then a small company rode the growth of the Net as far as anyone, becoming the dominant force in data networking and, briefly, the world’s most valuable corporation. Volpi served in several management positions at Cisco including chief strategy officer. He led Cisco’s aggressive acquisition strategy, using the company’s valuable stock to scoop up dozens of networking startups.

Cisco took a significant hit with the market’s collapse, though not nearly as severe as competitors such as Lucent and Nortel. The company reorganized last August, and Volpi moved over to become svp of Internet switching and services, Cisco’s largest product group.

While the service-provider market remains relatively stagnant, Volpi does see signs of hope in the enterprise. Post-September 11, disaster recovery, security and steps to make networks more resilient are a significant priority that companies are willing to spend money on. Also, Volpi says, “Convergence of different types of traffic onto single networks has appeal right now, because numerically it leads to a clear ROI.”

At Cisco, says Volpi, the watchword today is focus. The company is concentrating on a smaller set of opportunities and taking a longer-term view of how the market will grow. Having seen the boom and the bust close up, Volpi feels that he has a good handle on what happened.

The shift in capital markets was the first factor: "At one point, for our customers that bought this stuff, capital was free or almost free. Now it's extraordinarily expensive." Capital was especially free when Cisco funded companies to buy its products, through vendor financing arrangements.

The second problem, Volpi says, was limited scope of competition. The playing field wasn't level for new entrants, and there weren't enough broadband options for end-users to stimulate demand.

Connectivity and applications

Volpi sees a third dynamic at work as well. "If you look at any type of communication industry in the past, typically there has been an application which has allowed for the subsidization of a communication infrastructure," says Volpi. For example, voice phone calls subsidized the cost of running copper wiring everywhere. Volpi continues, "The Internet is the first time in history that the application is decoupled from the communication infrastructure." With connectivity divorced from application and content revenues, Volpi believes, the infrastructure is vulnerable to commoditization, making it unattractive for investors.

As a result, Volpi says, "There's plenty of available content, and some of the content can be fairly profitable, but it's not associated with the infrastructure underneath it." The AOL-Time Warner merger and Yahoo!'s partnership with SBC's DSL service, he says, indicate that some players see the need to combine content and conduit. *[Garry Betty might beg to differ (*SEE ABOVE*), and we've argued in the past that the potential market is bigger and more dynamic when connectivity and applications are separate (*SEE **RELEASE 1.0**, FEBRUARY 1999*). But we'll leave that debate for the panel....]*

Through the TechNet coalition and on its own, Cisco has been one of the most vocal technology companies calling for more government action to promote broadband deployment. Volpi admits there is some self-interest in the company's position, because Cisco sells the equipment broadband service providers will need. But in this case, he argues, what's good for Cisco really is good for America: "We do believe – and we have some relatively solid empirical and academic evidence – that broadband improves the productivity of the country and the economy."

Volpi himself was born in Italy and spent most of his childhood in Japan. He has been in Silicon Valley since coming to Stanford for college, with stints at HP and Stanford Business School before he joined Cisco. The environment there suits him quite well. "The wonderful thing about the US is that, when it comes to technology, we are early adopters," he notes.

PANEL: How to Feel Secure in an Insecure World (ED)

Since September 11, the visibility of security has increased dramatically. But security is not a product you can buy; it depends on everything from the carefulness of employees to the legal climate of liability for damages. Who's responsible if a system fails? This question is of intense interest to everyone from product vendors to insurance companies, but there are few binding precedents yet.... Act of God? Or act of some negligent corporation that should be punished as an example to others?

On the user side, it's relatively easy to secure data as it travels over the Internet. The challenge is figuring out who gets access to it and who controls it at either end. A computer system will do only what it's told to do. If an employee leaves a machine unattended but in available mode, and a janitor who isn't really a janitor walks by, the technical sophistication of your system becomes irrelevant.

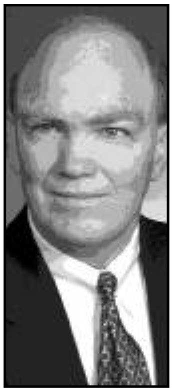
There are also issues on the technology side. For example, we need to move beyond firewalls and secure systems. Firewalls are designed to keep out the supposed bad guys. But what if the bad guys are on the inside? We need a detection system for internal anomalies such as the person coming to work at 3 am and sending a lot of emails with attachments. We need better management of all the different security devices – authentication, access controls, directories – as systems scale up in geography, size and complexity. Guardent offers such a service; Company 51 is working on ways to define and detect such anomalies without human intervention.

But most of all, we need an approach to network security that goes beyond technical issues. It's time to consider the social, political and legal issues, as Stewart Baker can do from long experience. How do we get enough diversity in our overall systems to contain the impact of any particular vulnerability? How do we create incentives that will encourage people really to care about security? Simply passing laws isn't enough.

Unfortunately, individuals have neither the power nor the personal incentive to take care of security in a significant way. You can talk about regulations and legal compliance and best practices, but what really changes behavior in these situations is corporate financial motivation.

The simplest route to that (shades of Y2K) may be to bring enterprise security to the financial markets' attention by way of the Securities and Exchange Commission. If all public companies were required to disclose their level of information security in their SEC filings, companies would waste no time in hiring an independent firm to conduct a security audit – and then fix whatever problems might be found. Ultimately, the financial markets (including insurance companies) would reward the companies who take security seriously – ideally before reality would "dis-incentivize" those who are careless.

Stewart Baker, Steptoe & Johnson — Watch and worry



Stewart Baker sees security from a range of perspectives. As general counsel for the National Security Agency from 1992 to 1994, he defended its Clipper Chip policy in public (whatever else he might have said about it from inside). As a lawyer at Steptoe & Johnson, he reflects the interests of clients, mostly technology companies, and he recently helped to found the US ISP Association.

But he can also speak for himself – as someone who has heard all the arguments about security and made most of them himself somewhere along the line. Which of them does *he* find most credible?

For example, who should be responsible for security – and liable for security failures? "I don't know if making companies generally liable is key to making the country secure; the idea makes me nervous on behalf of clients. Do we really want to bring out the trial lawyers of America to solve our security problems? We'll have to buy them all 727s – that's what they're asking for now – to fly around doing discovery. It's a very high-overhead way of making security happen. But yes, the people who bring plaintiffs' cases are already toying with this."

He continues: "I'm guessing that the companies on the front lines will be Microsoft and the ISPs, and financial institutions. Microsoft... take their recent statements about security, their auto-downloads. They're the interface to the Internet for so many of us, and there will always be something they didn't do. There have already been lawsuits against AOL for some glitches, some privacy lawsuits. I'm guessing the boom in security lawsuits is less than five years away once we combine home banking with permanent IP addresses in people's homes and always-on high-speed connections. Then we'll have injured consumers who lose substantial money from home."

Overall, he concludes cheerfully, "I work for ISPs, and for some financial institutions, and security companies.... If they all start suing each other, I'll have a problem!"

What would he do if he were still in the government?

"I'd focus first on the few risks that the market won't take care of – not the profit-motivated hackers, but people who take out infrastructure with a 767, hostile governments, things like that. We should also be taking action to push authentication into every corner of the Net. Once you've got a fix on who's responsible for an attack, it becomes pretty easy to stop it. Everyone will need a certificate; machines will need certificates. Everything will be traceable. If you have reason to believe you know who did something, there's a good chance you can get them put in jail. A lot of the casual attacks are from people who are pretty confident they won't face the consequences. If you undermine that confidence, you reduce the noise, and the serious attacks are easier to spot."

Network inertia

That indicates a world where no one will make transactions or accept mail without a certificate. "Of course, you have to struggle to get through the reverse network effect"– call it network inertia. "Soon, if you want your mail to get through, you'd better sign it. If you want to get through the airport, you'd better bring some ID. This is where government – and Passport/Liberty – could probably move things along."

But Baker does recognize a darker side: "For companies that are adopting security standards for themselves, there are some very interesting questions: data protection, the limits on employee privacy, conflicts with European approaches. But I have yet to meet a single company that says, 'okay, so we'll stop monitoring our network'.

"But we do need companies to have a code of ethics for the people who do the monitoring, and it would help to write those rules down. Every once in a while, one of those monitors falls in love with a co-worker, gets jilted, and does strange things. People are astonished and shocked at how much you can find out about people with network monitoring tools. I went to see one of these monitoring centers, and they could show me in realtime what site each employee was logged onto, and what password they used to get there.... Given how much these monitors see of human nature, they should already have some sense of their limits." Or do they?

Maria Cirino, Guardent – At the soft and chewy center

It all began with a male stripper, Maria Cirino recalls. This particular male stripper was also a part-time receptionist at Razorfish, where Cirino was vp of strategic alliances, but thinking of leaving to start a security company. "I went in to see [ceo] Jeff Dachis to complain: This kid had just turned down a multi-million-dollar contract from Aramark in favor of a couple-hundred-thousand job from JoeBoxer.com because he thought they were a lot cooler."

She continues: "Jeff said, 'I support that decision'. And so I left the next day. It probably accelerated my departure by two months – and preserved 98 percent of the value of my Razorfish shares. I'm eternally grateful to him." She sold part of her stake to found Guardent, a managed-security and security-consulting firm. It is now further capitalized, to the tune of more than $50 million, with funding from Charles River Ventures, Sequoia, NEA and Citicorp.

You could say that Guardent is something like a security-oriented version of fellow speaker Frank Ingari's CRM company Wheelhouse [SEE PAGE 21], but with a more substantial managed-services business component. (And indeed Cirino used to work with Frank Ingari at Lotus and then at Shiva before going to Razorfish.)

"We offer proactive security combining people, process and technology to provide better security than clients can achieve on their own and at lower cost," Cirino says. "Moreover, by leveraging our position as a benign 'big brother', simultaneously watching over hundreds of clients' security infrastructures, we can correlate security data across them, enabling us to detect trends" that a single company couldn't see.

Guardent had $4 million in revenues in 2000 and $13 million last year, says Cirino. "We had three major inflection points this year: NIMDA, Code Red, and 9/11. Since September, our business run-rate is up 40 percent; we've raised our estimates for this year to $28 million. But no one would say 2001 was a picnic. We had to throttle back and throttle forward. We should be profitable this half. We already had 200 managed services clients last year, mostly mid-sized companies. Our proposals this year are for larger enterprises" – such as investor/client Citibank.

Not just boxes anymore

Since September, Cirino adds, security is no longer a box to check or even boxes to buy. "Most people say they've invested in security: That is, they've bought firewalls and intrusion-detection tools in boxes, from Checkpoint, Cisco, ISS and the like. But perimeter security is almost irrelevant, because that's not where the problems are."

"We need to start looking at the soft and chewy center. The old trust model no longer works: all the good guys inside, all the bad guys outside. A lot of interesting work is being done in this area," including the work of fellow panelist Steve Hofmeyr at Company 51.

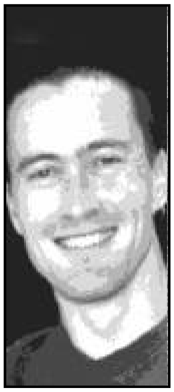
She takes a swipe at the competition, which she lists as primarily IBM and Counterpane. "We don't just manage and monitor firewalls; we don't just save you money doing what you always did. We understand the profile of your business infrastructure and can therefore quickly dismiss the things that don't matter (like an attack signature for a Windows operating system in a Unix environment). You need to be able to dismiss white noise and extraneous activity so that you're in a better position to quickly detect misuse by trusted people."

She continues: "We help you divide your infrastructure up into intelligent enclaves where you can control what happens within a particular segment rather than just what crosses borders. We don't sell this technology [called the Security Defense Appliance]; we land it within a [managed-services] client." That keeps the technology proprietary and lets Guardent continue to update and enhance it – just the sort of approach that increases Guardent's *own* security.

But as a services provider, Guardent is mostly agnostic about the technology it uses. "We see disruptive technologies like open source getting increasingly popular in security." Are you the Red Hat of security? we ask. "Not really. We also manage all the major third-party [proprietary] security tools. Clients aren't ready to throw the old stuff out, but they can add open-source tools where they don't have them today."

Steve Hofmeyr, Company 51 – Danger inside

Steve Hofmeyr got started in computer security by working with Stephanie Forrest of the University of New Mexico, who spoke in the "scientist" role at PC Forum in 1998. He's back to talk about this kind of work but from a commercial perspective, though Company 51 won't actually talk about itself much until this summer. [DISCLOSURE: ESTHER DYSON IS AN INVESTOR.]



His work centers on immune-system approaches to security, which he took up after becoming "disillusioned" with genetic algorithms, because "they weren't new and interesting anymore." Forrest introduced him to something more "original" – the intersection of immunology and computation. "Instead of intrusion detection, we are doing anomaly detection – focusing on behavior rather than identity."

Looking at the market overall, Hofmeyr says, “There are people doing this kind of thing already, but most of it isn’t autonomous or standalone. Instead of using human beings to define patterns and evaluate data, we tend to use data sources that people traditionally don’t even look at.

“Right now, the state of the art in security is knowledge-based: Some human expert has to know what’s going on. But if you have to bring in a human when you’re attacked, chances are it’s already too late. For example, by the time people figured out what Code Red was, it had already done huge damage. We have to figure out a way to do that recognition process in an automated way.”

Behavior-based analysis

Instead, he continues, “You see more and more ASPs. The biggest shortage is human expertise, and they are still offering 24/7 human expertise – just with the economies of spreading it over multiple customers. We have to get away from this dependence on human experts, and one of the best ways is behavior-based analysis.”

One example of such an approach is companies that protect against DDOS attacks, which profile network traffic. “Arbor Networks and Mazu Networks, for example, put out a lot of widely distributed monitoring points and use statistical profiling of traffic. Others operate more like firewalls, protecting a single site from attack without the ability to see what’s happening around the network.“

The biggest threats come in two forms, Hofmeyr continues: “One is highly specific, where very intelligent hackers will break in and steal what they want and avoid detection. These aren’t automated attacks, but they are very focused. The other is automated threats like worms, Code Red... things that are noticeable and can’t be hidden. Typically they cause downtime or loss of data, but not theft of data.”

Where are they from? we ask. “It’s very hard to determine. Most often the comments are in poor English, but you can’t tell if it’s American poor English or Chinese poor English. I ran a honeypot and got lots of attacks from .cn (China) and .tw (Taiwan). Are these hackers Chinese, or are the Chinese machines just vulnerable and being used by American hackers?”

The virus/worm threat is increasing as attacks become more sophisticated, co-evolving with the virus protection services. “When people talk about mutations,” Hofmeyr says, “it’s typically that a person has written a variant and that variant is spreading. People have written viruses that mutate by themselves, to avoid signature-based detection systems. All you have to do is maintain the functionality but change the strings that make it detectable... but that's not so easy to do. You can do it one-off, but to do that in some automated fashion is tougher. [*That gets back to those disappointing genetic algorithms. – ED*] Crypto-viruses – which look different until they're decrypted – are one form of that approach."

He continues cheerfully: "The most damaging ones are not the most visibly successful. If they were more subtle, like HIV, they could do more harm. Your typical email worm replicates fast and creates havoc. But consider one that copies itself occasionally and spreads further. If a worm managed to spread itself widely, and there was some way to control it remotely or a time bomb kind of thing.... You have to catch those when they break in, because they wouldn't give themselves away until it's too late."

INTERVIEW: The Microsoft Way (ED)

Rick Belluzzo, Microsoft

Rick Belluzzo is very happy to talk about something other than Microsoft's legal problems or its legacy businesses. "I'd much rather talk about the transition we're going through" whatever the reasons for it.

Belluzzo is in the lucky position of being a relative newcomer to Microsoft; he joined in 1999, after being ceo at Silicon Graphics. Thus he can disclaim responsibility for any past errors even as he takes responsibility for fixing them. "The industry and its ecosystem are not as healthy as we'd like them to be, including the success of our partners," he says. "We need to get better at working with them, collaborating on new products. We need to be more sensitive to the frustrations of end-users." And as outlined in another of those famous Bill Gates memos, the company needs to pay more attention to "trustworthy computing" including security issues – the more so given that Microsoft's broad reach means the impact of any vulnerabilities can spread quickly.

"Right now, we need to make it easier for OEMs to innovate around the PC. I have this passion – which I'm sharing with the key teams – to get the PC industry moving again. We need to help our partners determine the right investments and help them get better." This sounds like what Intel, an even older company (32 years vs. Microsoft's 27) has long been in the habit of doing (SEE PAGE 15).

Microsoft is also changing its basic business model (extant since the time of the first PC Forum), from product sales to revenue streams. “This is one of our big initiatives company-wide. It’s not solely an enterprise issue; it extends to businesses of all sizes and our consumer efforts as well. This recurring-revenue model is not just for the largest of companies the way it used to be, but for businesses of all sizes.”

Notes Belluzzo, “The packaged software business is complemented by what people can do on the Web, creating a new generation of consumer experiences that bring together best of traditional applications, devices and Web services. It starts with MSN, but then we’ll move Office into software-based services as well. Even with Xbox: We’ll launch Xbox broadband services around gaming online.”

HP/MS

How does Microsoft compare to 63-year-old Hewlett-Packard, where Belluzzo worked for 23 years? “At Microsoft, what’s appealing is the very expansive thinking that you find here. People believe they can do great things through the software we build, really significant things. For example, very few companies could have made a decision like creating the Xbox and pulled it off in just two years. People are very passionate about their work. We persevere in areas where few other people would persevere; they would have called it quits long ago. For example, take MSN – which is where I came in [as group vp for the Consumer & Commerce Group]. Sometimes we get criticized because we underestimate things, but while we may not get it right the first time, we do work to get it right over time.”

A case in point is Passport, which has already undergone some revisions. It’s key to the .Net vision, but is not intended to produce a huge revenue stream, Belluzzo says. “We needed a simple, single-sign-on authentication tool as part of the portfolio. It’s less about Passport being a business itself and more about creating an enabler for software-based services. As an industry we can’t expect sales of software-based Web services to take off unless we create a simple, consistent, and safe way for people to access their information on the Web. We have been asked and we have looked at joining Liberty Alliance. There are a variety of intellectual property issues there. We’re not religious, but we want to ensure it’s an appropriate model for all participants. With over 200 million Passport accounts today [most of them for Hotmail or MSN Messenger users] and an open, scalable, in-market system, we want to do what’s best for our customers and the industry. Today we’ve already opened up Passport for federation through industry standards so other people can host the information.... It’s unclear what more is needed.”

PANEL: Identity on the Frontier (ED)

Just a few years ago, the Internet community tended to use real-estate metaphors to talk about the Net – and, generally, the underlying notion was commercial real estate. Now you hear more about "digital identity," and you probably hear the term "namespace" as often as you hear "cyberspace."

Who owns those little chunks of turf, and who should manage them? Even as the philosophical debates rage, so do commercial/political ones. At one end, there's ICANN, trying to figure out the domain name space and the rules for its human directory, the so-called Whois. At the other, there's Microsoft with its .Net initiative and the accompanying Passport identity system for end-users, and the opposing Liberty Alliance. (Speaking of namespaces, the Liberty Alliance is not where you'd think; check out WWW.PROJECTLIBERTY.ORG.*)*

The Liberty Alliance was started by Sun and some pals as a counterthrust to Microsoft; see the discussion with Ed Zander below. But other members such as GM have different motivations. In the end, businesses want systems that work... and in the realm of digital identity, they want standards for trading and managing information securely.

Indeed, while we're encouraging enterprises to take more responsibility for their own security, new digital identity services (if the market works right) should give individuals more control over the disposition of their data. (Note that both Microsoft and Liberty Alliance have provoked concern from privacy advocates.) Most consumers want to keep their data in several places rather than putting all their eggs in a single basket.

We need better rules and better customer control over what happens to their data. ...For after all, it is theirs, just as the money a consumer gives to a bank still belongs to that individual. Although both parties to any transaction have rights to a record thereof, we all have the right to refuse to do business with people who won't agree to our conditions.

What we need, in a sense, is a better market for data practices, where people can make their own choices about what happens to their data. We don't need a one-size-fits-all law. We need an environment where you can trust the people who say that they're keeping your data secure, and where you have some recourse if they don't.

Tony Scott, General Motors – The other third of your life?

"Americans spend most their time at home, at work or in their cars," says Tony Scott, cto of General Motors. "The PC/Internet has effectively invaded our homes and our work lives. The car companies have a great opportunity to capitalize on all the time people spend in a car."

Not a car man himself, Scott worked at Sun, Price Waterhouse and Bristol-Myers Squibb before joining GM at a headhunter's invitation in 1999. "When someone calls you on behalf of the Fortune One company [as it then was], ya gotta take the call," he says.

Two years later, he spends his time at GM on information technology, as opposed to systems – things such as architecture, security infrastructure, standards, external initiatives such as Covisint (the much-ballyhooed automakers' exchange) and Liberty Alliance, and the software architecture for the "vehicle of the future."

Much of what he's working on is still years out. "There's a group of us in areas including product development, electrical engineering, IT.... Our thrust is to figure out the right software architecture for the car going forward. The way products and software in the car are viewed today is mostly as an integration problem. Anti-lock brakes, HVAC controls... you can get all of these from a variety of different vendors, and they don't inherently work together very well. There's no such thing today like a PC architecture. There's nothing to plug into and be guaranteed it will work. Obviously, there would be tremendous advantages to such a platform."

We're sure Craig Barrett would be happy to oblige! And indeed, says Scott, "We've been talking a lot with IBM, Sun, Intel, Microsoft and others about this. My role is to work with the GM folks who historically haven't worked with traditional computer hardware and operating systems and take them around and introduce them to people who do those things for a living." He's expecting to see some concrete results within a couple of years.

My partner's customer is my customer?

On the IT side, Scott says, "The car industry has an interesting problem, especially in the US. Because of strong franchise laws, it's been very difficult for the carmakers to develop direct relationships with their customers. The dealer community believes *it* owns the customer relationship. Historically, a large company like GM might not have direct contact with the customer until there's a warranty transaction. Let's say you went in every two years and bought a brand-new GM automobile; the dealer knew that but GM didn't. You could also have been a customer of GMAC [GM's finance arm] and DirecTV, but at the corporate level, GM didn't know you."

This new model offers GM a whole new set of customer data to work with, and a motivation for joining Liberty Alliance. Says Scott: "Our reasons were not anti-Microsoft. We expect Microsoft will continue to be pretty popular and successful. But there's an inherent mistrust of putting all your eggs in one basket – in the US, anyway. We walked ourselves through this: Whom do we trust with our banking data? A bank. Whom do we trust with our portfolio? A stock broker. With our health information? A doctor. And we hope: With our auto information – our car company. But there's also a need for interoperability. When you sign up with OnStar, for example, you can give medical info. But no one remembers to update their medical information with OnStar... they update their medical records only. A truly federated model would pre-authorize OnStar to get medical information in case of an accident, but it wouldn't allow OnStar willy-nilly to go in and explore your data."

In the scheme of things, OnStar offers a pretty compelling trade-off for the customer's data (as long as it is kept to its proper uses). Says Scott, "With OnStar, now active in about 2 million cars, we're selling safety and security in the vehicle directly to the customer. Push the button to get help, and we'll deploy 911 for you. We average about one [automated] emergency call per hour each and every day where the airbags have deployed and we dispatch emergency services...." In short, the technology saves lives. Not a bad return on investment.

Ed Zander, Sun Microsystems – Where the machines meet the men

Ed Zander, president and coo of Sun Microsystems, is the company's champion for non-techies. "I try to identify with everyday computer users," he explains. "I think too many people have their houses wired with 17 boxes, three kinds of networks and 13 different downloadable software apps. It's this complexity that has frustrated consumers."

But like any good frontiersman, Zander has an answer. Although Sun doesn't sell directly to consumers like, say, Microsoft, its back-end solutions support many consumer-facing systems. Its success depends on its customers' success in making consumers feel comfortable.

"The issues surrounding personal data present some big challenges for the industry," he says. "Who gets to control your data? And who has control of user databases? This is why Sun helped create the Liberty Alliance. We have two goals behind this effort. One is to keep the Net open, and the other is to make sure the Net is not controlled by any one vendor."

"Companies such as Nokia and United Airlines want to protect their customer databases," Zander continues. "And they want to offer consumer convenience. You want to be able to check your United Airlines miles with the same user ID and password you use to check your Bank of America checking account. That's the kind of service and convenience the Liberty specifications will allow.

"What we're doing through the Liberty Alliance is developing an open standard for three things: identity, so businesses and consumers have a common way of referring to one another; authentication, so we have a good way of confirming you are in fact who you say you are; and authorization, which means you can actually go do stuff – make a reservation, a bank transaction, or whatever," Zander says.

While Microsoft is learning to sell software as a service, Sun has to figure out how to use specs to drive sales of software and hardware. Says Zander: "Our strategy is, 'Build the specs, and greater Internet commerce will come.' It's similar to how Java further enabled the Internet, which was a good thing for Sun's business, even though we never tried to make a killing selling something like a shrink-wrapped box of Java. Java simply drove Net activity, which in turn created more demand for our products."

Like the rest of Web services, the Liberty Alliance rollout will happen in stages. "Initially, it will be introduced just for internal use within member companies," Zander says. "And then it will be used more broadly, so that companies can share data" – according to pre-set policies, of course. "We reach nirvana when we have a whole federation of companies following these policies and enabling an entirely new breed of services," says Zander.

Zander says Liberty plans to release technical specifications later this year, "and then turn everyone loose so they can implement in their particular areas. We also need to work on the security issues, and some people will have to retrofit their directories."

"Still, we don't want to turn this into a protracted legal standards body. We need to move fast enough so that we reach the market quickly."

Ironically, of course, the two systems – Passport and the Liberty Alliance implementations – will probably be remarkably similar. The difference will be in how they are used – the policies for managing access and use of the user data. "With Liberty, you add your own privacy policies and authentication practices on top, and customers – everyone from phone carriers to auto manufacturers – keep control of their own data," Zander says.

"Consumers also have a right to control access to their personal data," he says. "As Ed Zander, I have the right to decide who will see my data. But when I do want to share some of my data with trusted companies, there need to be some neutral, DNS-like registries to provide an established universal way of doing this. What DNS is for the Web, the Liberty architecture is going to be for on-line presence and ID. Those vendors who know their customers and can keep their data safe will win. Having a directory of your customers offers some long-term competitive advantages."

PANEL: Frontier Wisdom (ED and KW)

What can you say after a lifetime of change? This is a panel of pioneers whom we picked in part to show that nice guys can win. Jim Barksdale and Eric Schmidt have the respect not just of their peers, but of the many people who have worked for them over the years. Both talk as much about management as about technology or... perish the thought... stock prices. And both recently took on new challenges: Schmidt as ceo of Google, Barksdale as a philanthropist. Meanwhile, Cathy David has been in the e-commerce trenches at Target, the Midwest-based solid-value retailer that some people thought had missed the digital revolution. No spin-off IPO, just good merchandising and values that are now attracting even the upper-crust but newly cost-conscious Tar-zhay crowd.

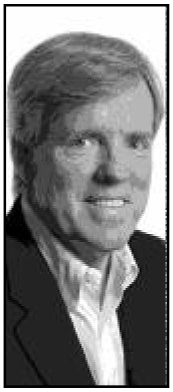
But winning as a nice guy does not mean just being nice. It means picking the right strategy, building a corporate culture and delivering value. Good companies are built on products that customers want and business models that persuade them to pay.

Over the last few years, some new-fangled business models have come and gone, but the old models have had to adapt, too. We're moving from products to services, from sales to revenue streams and subscriptions and from retail distribution vs. online to retail via online. Companies need to learn to communicate with – not just to – their customers, and they need to understand what to charge for in a world where many things seem to be free. It's just that someone is paying somewhere else.

So where are e-commerce and e-business going? What lessons have we learned from the boom and the bust? Will investors come back into the market? Are there no more venture-capital opportunities for The Barksdale Group, or is it just not the right time now?

Rather than Googling for more information, let's hear from the pioneers themselves....

Jim Barksdale, Barksdale Management – Meaning and measurement



I (Esther) first met Jim Barksdale in 1978, during a Federal Express financial analysts' meeting. At the time, he was senior vp and cio ...and at what was then a small company, his job included operating the robot that was supposed to impress the guests. FedEx, after all, was a high-tech company, with automated sorting systems and centralized call centers. The days of PCs, handheld devices for the couriers, in-van computers and tracking by customers over the Web – to say nothing of the e-commerce delivery business – were still in the future. It was Barksdale who first implemented many of those features.

Back in 1978, he reminisces, "I was so young, but I think I had already realized what I was good at and enjoyed and could add value to. Basically, it was the application of systems to business problems. You never sold a guy a computer; you sold him a solution. Nowadays it sounds corny. But nowadays, the growth in IBM and EDS is in services, not products. HP wants to acquire Compaq to expand in services, not PCs. I felt like I had something to contribute. And something I found to be plain-out fun. We thought we were changing the world...."

"That became the cornerstone of everything I've done since: The value of systems without necessarily being a techy. One of my real joys today is that I'm still active on the board of FedEx. I sit on the IT oversight committee at FedEx with Judy Estrin [a speaker at last year's PC Forum] and Shirley Jackson [president of Rensselaer]. We make tough decisions, but not *real* tough decisions, not like Enron. We have given FedEx straight advice, and to their credit they've taken most of it. The billing system, for example – half a billion over four to five years – was not meeting schedules. We had to make people changes, not just technology changes."

As a high-tech coo/ceo – first at McCaw Cellular (now AT&T Wireless) and then at Netscape – Barksdale had the benefit of having been a user before. "I could see what really mattered. I had much more empathy for why they bought the products." But he also brought people skills that were unusual in the industry, and made Netscape in particular a great place to work. “Dealing with over 3000 airline pilots helped me to deal with high-maintenance people,” he notes.

At Netscape, he presided over the rapid growth and ultimate sale of the firm to AOL when it lost market share in a slide that is now the subject of renewed litigation with Microsoft. Having gotten a taste for start-ups, he founded The Barksdale Group, which funded such notable companies as Tellme and Neoteris. The firm has now ceased new investments and is concentrating on its portfolio of 17 start-ups.

Back to the frontier

However, Barksdale has another life beyond business. Before Memphis and Federal Express, there was his home state of Mississippi. From The Barksdale Group, a VC firm, he has moved to Barksdale Management Corporation, which manages his affairs in real estate, cattle-raising and philanthropy.

Right now, he says, “I’m in sort of a transition phase, going from being an investor to getting more involved with our reading program than I was in the past.” That reading program is a statewide initiative in Mississippi to which he and his wife Sally have donated $100 million. So far, Barksdale has done some lobbying and helped raise federal money; now he will get more involved. “I can be effective as long as the issue is related to operations or raising money. And that’s what we need right now. I’ve seen a lot of people who were very altruistic but who couldn’t manage a large philanthropic organization.

“We’ve got over 27,000 students and 2000 teachers; we’re adding 10,000 students a year. We’ve done our baseline testing, but we won’t get good comparisons until the fall of 2003. Right now we’re on the dark side of the moon as far as empirical tests. We know that if teachers and principals are behind the program, the children learn. But we can’t prove it yet. We need to get empirical, statistical evidence of progress, not just anecdotal. You can only manage what you can measure.”

Cathy David, Target — Hitting the e-commerce bullseye

Cathy David, the head of Target’s e-commerce activities, doesn’t want to leave a negative impression. She admits that the click-and-mortar model has challenges compared to purely online retailing, but those must be balanced against the positives of being part of an established corporation. “I wish we were a pure-play sometimes,” she says, “And then I remember our $800-million marketing budget.”

Target Corporation is the fourth largest retailer in the US, with 1,400 stores, 250,000 employees and extensive catalog operations. It owns Marshall Fields and Mervyn's in addition to its eponymous discount chain. And, not surprisingly, it has a significant online presence.

Unlike other brick-and-mortar retailers that separated their e-commerce activities from the parent corporation, Target always kept its Web efforts in-house, as part of its Target.direct unit. "We've been bashed along the way for taking a very slow approach, or for not really getting it," says David. During the dotcom boom, companies such as Target were criticized, either because old-line companies couldn't possibly thrive in the new economy, or because in-house online operations couldn't take advantage of the stock-option and IPO-fueled pops of pure-play e-tailing stocks. Things look different today.

From David's perspective, the benefits of doing e-commerce inside a company like Target are significant. "We've already realized the synergies of combining a lot of the things you can combine in a corporation," such as finance, operations and IT, she notes. Target publishes over 50 million newspaper circulars every Sunday, which can drive transactions on the Web as well as in stores. Target.com benefits from company-wide negotiated deals with vendors and product suppliers. And there's that $800-million marketing budget of Target Corporation....

The key to making the online/offline combination work, David says, is "leadership that believes. You need to be tied in, and at the same time not tied to the same rules." Along those lines, it's essential to offer a consistent experience to meet customer expectations about the brand, she says.

No more brown boxes

Not that the online business is identical to the brick-and-mortar or catalog operation. David, whose first job at Target was as a buyer for home products for the physical stores, is quick to point out the differences. The most significant are the direct one-to-one relationships made possible by shipping products directly to customers. As David notes, "When you walk through our distribution center, you can see actual products. For Target, it's lots of brown boxes." Knowing immediately what individual customers are buying is a foundation for better analytics and merchandizing. The cultural differences are also pronounced. Executives at other companies are more willing to network and share information. David says she has learned a great deal from interactions with Amazon.com, which last September signed a deal to provide the software platform for Target.com and to host a co-branded section of the Amazon.com site.

David also points to subtle differences between Target's online and offline businesses. Unlike, say, the book business, where Amazon built its brand on offering a wider selection than physical channels, Target's online service has fewer items. Target.com carries about 10,000 products, compared to 65,000 or more in a Target store and 3 million in a Marshall Fields.

The countervailing benefit is convenience. "I think sometimes in a store you have too much choice," says David. "It's overwhelming. The fine line for us is, how do you have enough products in a product category to be credible, but not too much?" Twenty percent of Target's online sales come from gift registries; the registries in Target stores don't ship gifts directly to recipients. Another surprising difference is what products sell better online. Higher-priced products and larger sizes actually sell the best online, David says, exactly the opposite of what happens in the stores.

Target is now using what the online side has learned to help transform the parent company, especially in areas such as customer relationship management. E-commerce and discount stores such as Target were among the few retailing bright spots last quarter, so David feels Target.direct is in a good place. "I don't know how long it's going to take," she concludes, "but we're going look back and say, 'this was a critical time'." She's excited to be part of it.

Eric Schmidt, Google – How can you harness Peter Pan?

Eric Schmidt has been a pioneer many times – as a researcher at Bell Labs and Xerox PARC, as cto of Sun Microsystems from 1983 to 1997, as ceo tasked with turning around faltering Novell from 1997 to 2001 (he stabilized it and acquired Cambridge Technology Partners to increase the services component – shades of HP/Compaq), and now as ceo at Google, since last summer. But here his task is harder – not to screw it up. Google is probably the only pure Internet company that gets almost universal praise – and beyond that, universal affection. People like Google the way they used to like Yahoo! before it went neon. Google is still primary colors (plus green), satisfying people on the basis of search results rather than attitude, pizzazz or buzz.

Of course, it does have an attitude. The company cafeteria still serves Froot Loops®, Coca-Cola and GeniSoy bars 24 hours a day, and the 300-plus employees include two massage therapists and a neurosurgeon (according to the company's own jobs page). A cynical editor we know complains he can't find a reporter to write about the company because they all like it too much.

It's a daunting task to take a success like that and keep it a success, let alone guide it to the next stage without destroying its charm or profitability. Yet grow Google must: Like its peers, it has investors – Kleiner Perkins, Sequoia, and some individuals.

"The so-called new economy was a wonderful opportunity to make money, but it was obviously a bubble," says Schmidt. That's easy enough for him to say now, but we actually heard him say it in public two years ago, in February 2000.

Discovering the intellectual cowpaths

Schmidt is a nut about the truth, and he ascribes Google's appeal to its propensity to "reveal the truth." He says, "The first rule of Google is that the answer to any question does exist, and you've just got to find a way to get to it. It uses all the intellectual infrastructure built up in the last twenty years." With the enthusiasm of a true techy, he cites numerous examples of interesting facts and insights he has gleaned from Google – everything from inflation statistics to life-span calculators. "Popularity is a pretty good measure of reliability... except for Britney Spears."

"In short, Google changes things. The world at large is served by more information. Ted Turner is a particular hero of mine, independent of his politics. CNN caused dictators to change their behavior."

But for now, says Schmidt, one problem is getting more of the world's information onto the Web so that people can link it and Google can find it. Right now, the company is in a wonderful cycle – more investment, more ideas, better services, more revenues. All successful high-tech businesses grow like that. But now what? "We have to prove we can build a company," says Schmidt. "At Novell, I had to do things, make hard decisions. Here, it seems all I have to do is keep order... aside from investing in more hardware to keep up with our growth. In fact, that was my first mistake. I was too conservative and didn't hire or invest fast enough. Now we're looking at new content, new search tools," he says vaguely. One early sign: the recent deal with EarthLink to provide sponsored links – clearly identified! – and pure web results, replacing Overture (née GoTo)and its paid "search results."

Beyond that, Schmidt wants to make Google's relationship with its users more personal. "We've got a great service," he notes, "but the switching costs are low." Moreover, he needs to make the users more valuable as they stay. Possibilities might include notification/reputation services, to alert users to unusual activity around their own name – or someone else's. Anyone could offer such a service by auto-pinging Google with queries, but only Google, with access to its own data, could go several levels deep, noting unusual patterns of activity, following them out, and then alerting the relevant parties who had the appropriate subscription. For example, Alice at WonderWidgets might not think to track news related to Enron. But if her accounting firm is Andersen, it may be more relevant than she thinks. All these things come out eventually. But Google has the capability to "notice" them first.

Now Schmidt and team need to notice something even harder to detect accurately – effective line extensions that will keep its revenues flowing and its personality pure.

AFTERNOON SESSIONS

THE KILLER DEVICE: Visions of Handheld Nirvana

The convergence of mobile computing and communications has been expected for years, but no one seemed to get the combination right. Several vendors released "smart phones" that most people found lacking as both phones and handheld computing devices. The closest thing to a successful convergence device is Research in Motion's Blackberry, but it really does only one thing – wireless email – albeit, extremely well. The promise of convergence is to combine functions so that the whole is greater (while being physically smaller) than the sum of the parts.

In 2002, we finally have several aspirants that make strong claims to be the PalmPilot of this space, rather than the Newton. They offer some combination of voice, email, personal information management (PIM) and Web browsing in new, svelte hardware packages. They are still limited by the wireless networks they run over, but with so-called 2.5G and 3G packet-data networks on the way, that limitation is also easing.

At PC Forum, executives from four companies will showcase the next-generation handheld devices during Monday's general session. Each will explain why his or her device is the best combination of features and design tradeoffs. Attendees will be able to try out the devices themselves in the afternoon.

Danger

Danger is the new kid on the block. A classic Silicon Valley startup, it emerged from stealth mode in the fall with a device that is off the charts on the coolness scale.

Danger's Hiptop is designed to deliver the full Internet experience, including Web browsing, email, instant messaging, applications and interactive entertainment, while also serving as a mobile phone. It works on the packet-based 2.5G networks launching in the US this year. Danger will sell the Hiptop through wireless carriers.

Co-founders Andy Rubin and Joe Britt came from WebTV (run by speaker Steve Perlman); third co-founder Matt Hershenson also has a Perlman connection, at his previous company Catapult Entertainment. Danger has raised $48 million from Softbank, Redpoint Ventures, Deutsche Telekom's T-Venture, Orange Ventures, Inovate Communications Group and Diamondhead Ventures.

Handspring

When Palm co-founders Jeff Hawkins and Donna Dubinsky left along with vp of marketing Ed Colligan to form Handspring, no one expected them to sit still and churn out lookalike Palm clones. Though it uses the Palm OS, Handspring has from the beginning been an innovator, starting with its Springboard expansion slot. Its biggest innovation just hit the market. The Treo is a full-fledged Palm OS personal digital assistant and a fully functional dual-band mobile phone, in a package smaller than most existing Palm devices.

Handspring has announced two versions of the Treo, a black-and-white model shipping now and a more-expensive color-screen model later this year. Both come with a choice of the traditional Graffiti pen-based input mechanism or a built-in keyboard.

Palm

The company that started it all, Palm now faces challenges to its lead in the handheld market. It has split its hardware business from its software licensing arm, now in a separate subsidiary called PalmSource (run by former Apple and AT&T cto Dave Nagel). More than 20 million Palm-powered devices have been sold, but the world is clearly moving toward wireless connectivity. The wireless-enabled Palm VII was innovative and ahead of its time, but for those reasons it has been a mixed success.

In late January, Palm announced the i705, its next-generation wireless device. The i705 is the only device we're showcasing without voice functionality. On the other side of the ledger, it offers all the benefits of a Palm, including an expansion slot, with the email notification that has been such as selling point for the Blackberry.

Research in Motion (RIM)

RIM is known for its Blackberry wireless email devices, which we handed out to PC Forum attendees in 2000. The Canadian company has sold more than a quarter million of them. In fields such as investment banking, Blackberries seem as common as mobile phones. The allure of being always connected is powerful, it seems, especially with RIM's integrated "push" notification and email synchronization.

What RIM hasn't offered is voice capability. Until now. RIM's Blackberry 5810 integrates a GSM phone with the company's existing wireless email and PIM functions. It incorporates Java 2 Micro Edition as its core operating system. And it does so in a form factor nearly identical to RIM's existing PDA-sized Blackberry 957.

INTERFACE GALLERY

One frontier that we never seem to cross is the boundary between people and machines. The graphical user interface was a giant leap forward... but that was 20 years ago. It has developed since then, and it still does some things extremely well. Familiarity can, in some cases, also breed usability. Yet even those who believe Windows XP or Mac OS X are the best operating systems ever built must admit that the desktop interface model isn't perfect. There are many problems it doesn't handle particularly well; many scenarios where alternate interfaces, if they could get to market, might either supplement or replace today's environments. With user needs come business opportunities.

Interfaces can't be described in the abstract. You have to see them and interact with them. The four companies demonstrating in the Gallery will show their products throughout Monday and Tuesday afternoon.

Interface innovators must find ways to innovate in a Windows-dominated world. These are commercial offerings, not research projects. Each has its own strategy: running on Linux (Ximian), delivering interfaces that work on top of Windows or on non-PC devices (Cincro and Mirror Worlds), or literally taking back part of the screen from the operating system (XSides).

CINCRO's Looking Glass software introduces a new way to look at information. Literally. Looking Glass provides a zoomable, multi-user canvas on which documents sit. The Java-based system handles textual files, images and even applications. Users can import objects and add simple annotations. The novel part is that users can pan and zoom around the canvas, as though flying overhead. Cincro's technology refreshes the contents of the screen in realtime at different resolutions as users zoom in and out.

MIRROR WORLDS was founded by David Gelernter, an influential Yale computer scientist, whose 1991 book of that name anticipated many aspects of the Web. The company's Scopeware product replaces the desktop metaphor for organizing information with one based on time. It organizes documents into "streams," with the most recent ones on top. Mirror Worlds' current management team, led by ceo Michael Satow, came primarily from MarketXT, an early after-hours online stock-trading network. Gelernter, who remains at Yale, serves at Mirror Worlds' chief scientist.

XIMIAN builds productivity applications and other software that run on Linux. The company was co-founded by Miguel de Icaza and Nat Frieman, leaders of the GNOME open-source graphical user interface project. In addition to extending GNOME and developing a Linux version of Microsoft's .Net development platform, Ximian makes Evolution, a full-featured email and groupware application for Linux. It offers a comparable feature set to Microsoft Outlook (with some added functions), and soon will connect to Exchange servers through an optional module.

XSIDES takes control of a portion of the screen from the computer's operating system (Windows and others). It intercepts window-sizing system calls to fool the OS into thinking that a portion of the screen doesn't exist, then allows new content and applications to run in that area. The software handles security and data sharing, so that from the user's perspective the new window is an ordinary section of the screen.

One potential application is to allow PC manufacturers or independent software vendors to circumvent Microsoft's control of the desktop. (Interestingly, XSides ceo Bob Steinberg was the lawyer for Stac Electronics when it won a $120-million patent infringement lawsuit against Microsoft in 1994.) Beyond Windows, though, XSides also sees its technology being used by companies looking to deliver content in one format to incompatible set-top boxes, or enterprises seeking a secure messaging channel directly to employee desktops.

STARTUP CLUSTERS

As noted below, all of our company presentations are from debuting companies. But there's also plenty of innovation going on among startups that are slightly farther along.

As the environment has become more difficult, the number of ecologically rich niches for new companies has shrunk. Even when their business models or target markets are different, small companies are clustering around a small number of big opportunities. Some of these watering holes amid the tumbleweed desert of our current economy have the capacity to support large cities in a few years.

We've brought together some of the leading new companies in four emerging areas to illustrate both what they are doing individually and the broader trends they represent collectively. All four topics have been covered, in one way or another, in recent issues of **RELEASE 1.0.** *Think of this, if you want, as a live version of the newsletter. (Or if you prefer, think of it as an event that may change your business life forever....)*

The sessions, on Tuesday afternoon, will replace our usual company presentation repetitions. They will be moderated by Clay Shirky and Cory Doctorow, both of whom spoke at PC Forum last year on our peer-to-peer (P2P) roundtable. Both now wear different hats than they did a year ago: Shirky is an independent writer and consultant, while Doctorow is now outreach coordinator at the Electronic Frontier Foundation.

Web Services (Shirky)

Web services will make their presence felt at PC Forum in several places – morning panels, company presenter Blue Titan and here. The development and adoption of standards such as extensible markup language (XML) and simple object access protocol (SOAP) for linking together software components is a major trend.

For now, Web services are still new enough to have startups building business plans around them. Ultimately there won't be a separate "Web services" sector any more than there is a separate client-server market today. Large companies such as IBM, Microsoft and BEA are already active participants in the Web-services world. Initially at least, Web services may be a different platform for delivering the same applications more efficiently, though down the road they open up new possibilities.

The participants in this cluster have all been building Web services since before the concept had a familiar name. Their companies do very different things; a deep commitment to Web services as a new platform is the fundamental element they have in common.

CORPORATE OXYGEN ceo Rajiv Gupta founded the company after leaving HP along with several members of his team last year. At HP, Gupta led the development of e-Speak, a pioneering software development and deployment platform for Web services. Gupta had to evangelize the novel concept of Web-enabled loosely-coupled systems, even as his team built the technical infrastructure from the ground up and created some of the first true production Web services (SEE **RELEASE 1.0**, JANUARY 2000 AND OCTOBER 2001).

At Corporate Oxygen, Gupta is tackling the new set of challenges that emerge as Web services go mainstream, such as robustness, scalability, security and manageability. Gupta isn't ready to reveal all the details of his new endeavor, other than that it involves management and monitoring of service-oriented architectures, without which enterprises are unlikely to commit to significant Web-services investments.

GRAND CENTRAL is a Web-services network, delivering security, reliability and policy management for services that can span multiple companies (SEE **RELEASE 1.0**, DECEMBER 2000 AND OCTOBER 2001). The company was started by 12 Entrepreneuring, an incubator led by CNet founder Halsey Minor, and became independent when 12 shut down late last year. Grand Central's initial customers are in the finance industry, including Putnam Lovell, Thomas Weisel Partners and Wachovia. Ceo Craig Donato was previously a senior vp of Excite@Home, which gave him exposure to the challenges of pulling together a network of resources in a coherent way.

SYSTINET, which used to be called Idoox, was included in our Web-services report last fall (SEE **RELEASE 1.0**, SEPTEMBER 2001). [DISCLOSURE: ESTHER DYSON IS AN INVESTOR AND DIRECTOR.] In addition to changing its name, the company has since brought in former Sun peer-to-peer evangelist Anne Thomas Manes as cto. As the Web-services development market becomes increasingly crowded, Systinet is banking on its technology head-start and its low development costs with engineers in the Czech Republic. Earlier this month the company announced a $21-million investment from Warburg Pincus. Systinet ceo Roman Stanek previously founded Java development tool vendor Netbeans, which he sold to Sun.

TALARIS is a company that shows the kinds of new functionality Web services can enable. Talaris ceo Patrick Grady, whose background is in venture capital, started the company in June 1999 to solve real-world problems: the pain enterprises feel in buying and managing administrative and other business services. Procurement solutions and business-to-business software exist to help companies buy goods, but services such as travel, restaurant reservations, conference call scheduling, and package shipping are more complicated. Individual vendors offer Web-based interfaces, but not a means to compare options and integrate with internal systems and notification functions. Talaris uses Web services to tie everything together.

Peer-to-Peer Content Distribution (Doctorow)

Last year, when we organized a roundtable on peer-to-peer (P2P), it was still a fresh concept. Though it seems as if the P2P wave has come and gone, that's not quite the whole story. P2P systems, or more broadly, decentralized computing architectures, have gone from a cool concept to an architecture manifesting itself in real applications.

Along the way the model has lost some of its sizzle and much of its ideological purity, but that's to be expected. The fundamental value proposition – a massive and distributed networked computing environment calls for distributed solutions – remains in force.

One of the most promising applications for distributed approaches is content distribution. Sending large files and rich media all the way across the network each time they are requested wastes bandwidth and makes it difficult to guarantee reliability. Better to take advantage of resources already distributed around the network.

*We covered this space at length – and the four startups below – two months ago (*SEE **RELEASE 1.0**, JANUARY 2002*). Each company takes a slightly different approach, in terms of the markets they focus on, the interfaces they deliver and the degree to which they pull content from other end-users or from network-based edge caches.*

BLUE FALCON has been developing its technology since 1995, originally under the name Static Online. Its initial market is streaming audio broadcasting, enabling Webcasters and online radio stations to cut their costs substantially, but it also plans to target enterprise customers. The company was founded by Damien Stolarz shortly after he completed his computer science studies at UCLA; current ceo Jay Haynes joined in December 2000 from mValue.com, an online privacy startup he founded.

KONTIKI has created a secure media delivery network that makes it easy for users to find, acquire and view digital media. Its client software organizes content and also manages downloads, taking advantage of several techniques to make delivery more efficient and reliable. Kontiki founder and ceo, Mike Homer, held several senior executive positions at Netscape. He is also an investor in or advisor to several Silicon Valley companies, including Loudcloud, Tellme Networks, Palm and TiVo.

RADIANCE focuses on guaranteed, scheduled delivery of high-value digital content. It uses distributed distribution servers to ensure quality of service, rather than depend on unreliable end-user nodes. It allows related files to be grouped together into packages by managing metadata that flows across its network. Founder and ceo Ash Munshi was previously involved with three business-to-business startups, including the predecessor to Ariba.

UPRIZER's Karma technology makes it possible to retrieve files from the network efficiently without knowing their location or consulting a central directory. The company sees several potential applications for its technology, including enterprise portals and rich media delivery to mobile devices. Co-founder Ian Clarke created the Freenet project, an open-source P2P file-sharing system that offers near-complete anonymity. Uprizer ceo Dave Scantling joined last fall from HP.

Open Spectrum (802.11/WiFi) (Doctorow)

Call it what you will; something big is happening around unlicensed wireless networks. Both community and commercial services are taking advantage of free spectrum to deliver untethered broadband connectivity. As the world wakes up to the prevalence of public access points and fee-based hotspots in airports, hotels and coffee shops, entrepreneurs are going much further.

In an unlicensed environment, the network is *the endpoints. When those endpoints use common standards such as IEEE 802.11b, otherwise known as WiFi, every new node potentially adds to the aggregate network footprint. Furthermore, with meshed topologies that connect every node peer-to-peer rather than going through a central hub, unlicensed wireless networks can actually increase capacity and reliability as they grow. What today is an interesting network access method for traveling executives and café denizens may turn into a widespread mechanism for high-speed Internet connectivity and an alternative approach to residential broadband.*

*As we discussed in an earlier issue (*SEE **RELEASE 1.0**, NOVEMBER 2001*), the full potential of open spectrum won't be realized until government opens up more wireless spectrum for shared use. The exciting aspect of 802.11, and of the companies below, is what's possible even in the current regulatory environment.*

BOINGO was started by EarthLink founder Sky Dayton, which in itself gives credibility to the unlicensed wireless space. Its plan is to link up the thousands of access points deployed throughout the country into a virtual network, using a desktop client that makes finding a node easy and manages billing and authentication. (A difference from company presenter Joltage Networks is that Boingo focuses initially on established access points). President Dave Hagen was formerly president of Ticketmaster CitySearch, and before that spent 15 years as an executive at Sprint.

SKYPILOT is creating a last-mile broadband network using meshed networking based on 802.11a unlicensed wireless technology. By creating its own devices, including a rooftop antenna and an indoor unit that receives data from the antenna and serves the customer, SkyPilot believes it can deliver speeds significantly greater than DSL at comparable or even lower prices. The meshed topology, which uses short links between subscribers instead of long links to a distant hub, gets around the line-of-sight limitations of most fixed-wireless systems. SkyPilot is in engineering trials today, with plans to deploy a testbed network in Silicon Valley this year.

SPUTNIK provides gateway software that can turn any Intel-based PC with major brands of 802.11b cards into a secure wireless access point. Existing gateways act as hubs, broadcasting traffic indiscriminately; Sputnik turns them into routers, handling only authenticated traffic. Users who set up Sputnik gateways can share unused bandwidth with other Sputnik subscribers, and can in turn use other Sputnik gateways when they are in range. Sputnik's three founders, including ceo David LaDuke, previously founded outsourced Linux support startup LinuxCare.

Dynamic Internet Applications (Shirky)

*The Web is ubiquitous; it's standards-based; it's massive; and it's a revolutionary medium for browsing information. Yet it's so... painful as a platform for applications. We explored these problems recently, under the heading of realtime computing (*SEE **RELEASE 1.0**, DECEMBER 2001*).*

Run a local desktop application or an enterprise client-server application, and they respond immediately to your actions. The interface is dynamic and optimized for the task at hand. Try doing similar functions on the Web, and most of the time you're faced with repetitive form-based interfaces and constant screen refreshes. Furthermore, the information that drives the application may be split between your local system and continually updated data delivered through the Net. Or it may reside in so many different places on the network that bringing it together manually is painful and slow. The major enterprise software vendors have created custom Web-based front ends, but that approach is expensive and slow.

The gap between the Net and desktop applications becomes more prominent in a world of Web services. Web services tie together network-based applications on the back end, but they don't necessarily help with the front-end interfaces.

The participants on this panel offer a variety of solutions that combine the best aspects of the Web and local applications.

ALTIO uses XML to support realtime presentation-layer interfaces, similar to those available on the desktop, for applications delivered over the Web. Its presentation server splits interface design from application logic, allowing customers to build, deploy and manage dynamic Internet applications by synchronizing with client-side applets. Altio supports Web-services standards, though it can also be used with existing Java-based applications. Founder Dave Levett was previously director of innovation at Talus Solutions. Altio was originally based in London, but is now headquartered in Boston, MA.

FIRSTRAIN makes it possible to pull together content from remote Websites into a unified interface, automatically maintaining the linkage even when the remote pages change. These "snippets" can be chained together into custom applications, or published as Web services. FirstRain also offers information discovery tools that scan the Web for recently updated information by drilling down on specific topic areas. The company's founder, JP Singh, developed FirstRain's technology while a professor of computer science at Princeton.

JUICE SOFTWARE delivers automatically updated data from the Internet directly into desktop productivity applications such as Word and Excel. It allows users to automate tasks such as building financial models dependent on current stock prices and other data. The company provides connectors to common data sources, and wizards to simplify linking network-based data into the local applications. Co-founder and ceo Kim Malone has been involved with two other Internet startups, after serving as a senior policy advisor at the FCC (where, coincidentally, she worked with EDventure's Kevin Werbach).

KENAMEA, which we covered in our realtime computing report, has created an application network that serves as a reliable, secure realtime messaging layer on top of the Web's standard hypertext transfer protocol. Lightweight client-side connectors maintain persistent connections with the application network, allowing applications to be built that run over the Web with dynamic visual interfaces. Co-founder and cto Bob Pasker was a co-founder of application-server vendor WebLogic, which was acquired by BEA; co-founder and ceo John Blair previously was a partner at the McKenna Group, and before that founded Hypertec, an Australian computer product design and manufacturing company.

COMPANY PRESENTERS

Contrary to what you may be hearing, there is no shortage of startups building novel technologies and addressing real market needs. Granted, some hot areas have turned into ghost towns. And VCs are still circling the wagons. Despite this, determined entrepreneurs have been able to stake their claims on new opportunities.

This year, all nine company presenters at PC Forum are debutantes, launching themselves or revealing significant details for the first time. We've organized them loosely into three categories; each group will present in the same room at the Forum.

Making sense

Understanding and managing in complex environments remains a central information-technology challenge, and one that manifests itself in many different ways.

BLUE TITAN allows companies to deploy and manage Web services in complex, mission-critical environments.

CANESTA makes it possible for machines to perceive the world around them in three dimensions.

H5 TECHNOLOGIES captures what unstructured documents are about, allowing them to be organized and retrieved more precisely.

Wireless frontiers

Mobile and pervasive computing are huge opportunities, especially with exciting new wireless networking technologies. We've heard the story before, but this time it may actually come true.

JOLTAGE NETWORKS is taking advantage of the unlicensed wireless revolution to build an infinitely scalable network.

NEXT NET APPLIANCE lets wireless devices view full graphical Web pages, without re-coding.

SOLOMIO connects voice and data services to give mobile-phone users a new range of options for dealing with incoming calls.

Rethinking infrastructure

The biggest IT problem most companies face is keeping up with growth. This is especially true in two areas: messaging and storage.

> **IRONPORT** transforms the email gateway, starting with better performance and eventually making new functions possible.
>
> **ISILON SYSTEMS** tackles the unique storage needs of content-based applications.
>
> **ZAMBEEL** makes storage more flexible and manageable than ever before.

Descriptions of all the presenters, in alphabetical order, are below.

Blue Titan Software — Putting Web services to work

"The very things that make Web services great are what ultimately make them fallible," says Blue Titan vp of marketing Sam Boonin. As we've written (SEE **RELEASE 1.0**, SEPTEMBER AND OCTOBER, 2001), Web services are powerful and widely supported tools for integrating applications and components using Internet standards. "One of the basic fundamental promises Web services offer is that, regardless of what your world looks like, there's a very simple set of standards that lets parts of your world communicate with the rest of your world," explains chairman and cto Frank Martinez. Because Web services are loosely coupled rather than centrally controlled, however, ensuring end-to-end performance is a challenge.

BLUE TITAN SOFTWARE INFO

Headquarters: San Francisco, CA
Founded: July 2001
Employees: 30
Funding: undisclosed; lead investor Draper Fisher Jurvetson
URL: www.bluetitan.com

Blue Titan offers an integrated line of products to compose, network and orchestrate "mission-critical" Web services. When Web services are used for departmental projects or less-critical efforts such as employee portals, some reliability hiccups may be tolerable in return for the lower costs and greater flexibility that Web services deliver. But for services tied to core business processes, especially those that span multiple systems, performance and management are essential. "It's unacceptable for these mission-critical Web services to fail, since that would cause immediate and irreversible financial impact," says Boonin.

Fueled by promotional activity and product launches from Microsoft, IBM and other major players, experimentation with Web services is widespread in enterprises today. Martinez says that his recent visits with potential customers have convinced him that a substantial number of companies are going much further. "With the kinds of benefits that these folks are realizing today from Web services, they really don't want the rest of the world to know what direction they are heading in," he says.

The companies jumping whole-hog into Web services are now running into the limitations of homegrown approaches. Functions such as message routing, guaranteed delivery, change management, performance monitoring, transactional integrity, access control, permissions, logging, failover and load balancing aren't easy to achieve in a loosely coupled environment. That's where Blue Titan comes in. "At the highest level, the way that we approach the opportunity and the problems associated with Web services is from an architectural perspective," says Martinez.

"There's a proliferation of people that provide you with some tool that can allow you to create a Web service," Martinez continues. "That's really not the problem." Blue Titan sees itself addressing the core real-world problems companies face deploying Web services to connect up their internal systems. (It focuses less on Web services to connect systems *between* companies, which it sees taking longer to gain traction.)

Application servers and their associated platforms address similar problems in established e-business architectures, but Blue Titan believes the Web services world calls for its own management layer. "The question is, 'do you want to use a tightly coupled architecture to support these loosely coupled components that will proliferate around your enterprise?'" asks Boonin.

Canesta – Now you see it

Canesta has developed a low-cost technology that allows machines to perceive objects in three dimensions. Founder Nazim Kareemi has always had an interest in new human-computer interfaces. He started pen computing software vendor Penware in 1992. Though Penware developed a viable business, Kareemi, like the rest of the pen-computing industry, found it difficult to create an effective interface for broad-based applications with the technology of the time. With Canesta, he went back to the drawing board, looking for new approaches to solve a fundamental problem.

"Today, if you look at machines, basically they are blind," Kareemi says. Computer vision and robotics technologies provide some ability to discern objects in space, but these systems are limited and typically cost millions of dollars. If it were possible to build affordable sensors that tracked objects in three dimensions in realtime, Kareemi realized, it would create major new opportunities.

Following Moore's Law, computers have gotten more and more powerful, yet, Kareemi notes, "The area where we haven't made much progress is human-machine interaction." He continues, "If you look at how human beings work, when you look at visual perception, you can convey a huge amount of information. But today, if you look at the way we interact with machines, it's very simple."

CANESTA INFO

Headquarters: San Jose, CA
Founded: April 1999
Employees: 35+
Funding: $20 million from Carlyle Venture Partners, Apax Partners, JP Morgan Partners, TechFund Capital and Thales Corporate Ventures
URL: www.canesta.com

To solve this problem, Canesta brought together experts from several disciplines, including physics, semiconductors, software and optics. The company spent three years developing its technology, filing numerous patent applications along the way. It eventually developed a system involving chips that calculate relative position based on the time it takes for light to bounce off an object, refined with sophisticated embedded image-processing software. "With our technology machines can start seeing and recognizing objects, and can start tracking them," Kareemi explains.

This opens up a whole set of potential applications. For example, Kareemi says, "a big issue is that in mobile computers and mobile devices there are some constraints. For example, there is a form factor constraint." A convenient device such as a mobile phone or handheld computer doesn't have enough room for a full-size keyboard. But what if you could type on a virtual keyboard in front of the device, and use an electronic-perception sensor to determine which keys your fingers were hitting?

That's only the beginning. Gaming is an obvious area where the ability to perceive objects in three dimensions could have significant benefits. Car navigation and security sensors are also possibilities. "Going forward, we're coming up with electronic perception technologies which are broadly applicable," says Kareemi. The key is lowering the price to the point at which adding perception to a device or application doesn't add significant cost. At that point, application designers will come up with new uses for the technology on their own.

H5 Technologies – Head of the classifiers

H5 Technologies was founded to commercialize a new approach to an old problem, text analysis. In other words, how to assign concepts or categories to unstructured text (SEE **RELEASE 1.0**, JANUARY 2002). Says ceo Nicolas Economou, "it was very clear that there were two prevalent approaches: statistical or rules-based. They had significant shortcomings and hadn't been fundamentally improved in a long time."

Economou, who was working at European engineering and technology company ABB Asea Brown Boveri, first came across the technology that now powers H5 in an early-1999 meeting with its inventor, Joel Jeffrey, a computer science professor at the University of Northern Illinois. Economou went to Mitch Marcus, chair of the Penn computer science department, for a technical evaluation. Marcus was impressed. He called Jeffrey's work one of two fundamental breakthroughs in text-analysis in the past 35 years (Google's link structure analysis being the other). Marcus subsequently joined H5's advisory board, as have John Seely Brown and Thinking Machines founder Danny Hillis.

H5 TECHNOLOGIES INFO

Headquarters: San Francisco, CA
Founded: August 1999
Employees: 50
Funding: $15 million from Hilal Capital, Gainesborough Investments, Arcadian Capital, VeriSign founderJames Bidzos and Silicon Valley Bank Chairman John Dean
URL: www.h5technologies.com

H5's technology captures the "aboutness" of a document. Unlike traditional approaches, it requires no training on a set of documents by customers. A customer just starts feeding content into the system, and it produces category matches. Second, the H5 system classifies documents according to very fine distinctions, of the sort that typically only human beings have been able to make. Third, because it doesn't require a central repository of documents, it works well in distributed environments, which are increasingly common.

Not everyone needs this level of sophistication. Basic classification of news stories for a consumer portal, for example, can probably be handled by existing clustering solutions such as Autonomy. But many organizations today use human classifiers because no automated solution is good enough. Some US intelligence agencies, for example, employ scores of people to organize incoming documents into hundreds or even thousands of different categories. The US Office of Naval Intelligence is now working with H5 to automate its document-classification process. Healthcare, where accurate tagging of patient records and charts is a matter of essential regulatory compliance and potentially life or death, is another potential market, as are insurance and pharmaceuticals.

The basis of H5's approach is a new kind of knowledgebase that encodes not abstract concepts, but conversational structures in baseline documents. "We're taking a much more pragmatic approach to knowledge representation," says product marketing manager Dana Zimmerman. By representing the ways people actually talk about subjects, H5 comes closer than traditional approaches to what human classifiers do manually. The company uses patented algorithms, operating on its knowledgebase, to assign the categories for previously unseen documents.

"The H5 platform measures what text is about in a structured way that captures all the distinctions that people would make," concludes Economou. In case you're wondering, the company name alludes to H4, the nautical clock that solved the longstanding 18th-century challenge of determining longitude. H5 similarly sees itself applying a scientific breakthrough to open up new vistas for business and society.

IronPort Systems — Email gateways that deliver

Email may well be the Internet's killer app, but email infrastructure has long been neglected. IronPort aims to change that. Its ceo Scott Weiss was an early employee of Hotmail; co-founder Scott Banister started email list outsourcer ListBot, which like Hotmail was acquired by Microsoft. Having built some of the Net's largest email systems, IronPort's team knows just how messy the current environment is.

As Weiss explains, "What we're really looking to do is revamp the way that email is sent around the Internet. Today we've almost taken for granted the fact that when you're composing email on Outlook and it goes to an Exchange server, that the man behind the curtain works and works well. But the truth is that you have a hodgepodge of freeware products that make up the email infrastructure."

IRONPORT SYSTEMS INFO

Headquarters: San Bruno, CA
Founded: November 2000
Employees: 25
Funding: $3.9 million from Starterfluid, Amicus and others
URL: www.ironport.com

Though email has been around for decades, it's only in the last six years that corporations have routinely deployed gateways to support inter-company mail over the public Internet. During that time, Weiss points out, "Most of the innovation was happening on the Web, so everyone with a brain and money was turning over every last rock on the Web. Whereas email was this little red-headed stepchild that was growing in the corner." Most companies still use sendmail (SEE **RELEASE 1.0**, MARCH 1999), an open-source product that has stood the test of time but is notoriously difficult to configure and scale, even in its commercial incarnation.

Now that IT budgets have shriveled, and with email traffic continuing to grow, fewer companies are willing to keep throwing money, expensive Sun servers and custom code at their email infrastructure. Yet employees expect email to be as reliable as the phone system. Notes Weiss, "Today, troubleshooting mail is nearly impossible. The current solutions are black boxes. There really isn't much visibility on what's happening at the edge of your network."

IronPort has developed an email gateway platform that offers superior performance, manageability, availability and visibility to other solutions on the market. It has created a special-purpose operating system for scalable asynchronous messaging, which it will embed in a line of appliances. IronPort has twenty customers in trials.

Email usage will only continue to grow, Weiss believes. For example, Wal-Mart currently has a database of 750,000 opt-in customer email addresses that it is actively growing, but it has a long way to go to match the 90 million circulars it sends out every week. "Every corporation out there would like to have a one-to-one email relationship with you," says Weiss. Machine-to-machine email communication will also be an area of tremendous growth, riding the development of Web services.

Beyond increasing performance, IronPort sees itself as a force for innovation in email technologies. "Simple Mail Transport Protocol hasn't had innovation in 20 years," observes Weiss. IronPort hopes to follow the path of Network Appliance, which originally gained traction offering file servers with high performance, but thrives today because of its features and manageability. For example, functions such as cryptographic security, differentiated quality of service and intelligent routing could be delivered in standards-based ways through Internet email gateways.

Isilon Systems — Better storage for richer content

Sujal Patel, the founder and cto of Isilon Systems, got the idea for his current company during his interactions with customers at his previous job as the head of engineering for infrastructure products at RealNetworks. As he recalls, "I would look at deals where Real would sell $1 million of software... and someone else would sell $4 million of storage to the same company. It gets under your skin a little bit."

Patel wasn't the only one to notice the potential of storage. Other than death and taxes, nothing is so certain as that storage demands will continue to increase. Unfortunately, there are over 100 storage technology startups out there today (INCLUDING ZAMBEEL, BELOW).

Patel recognized that the opportunities for general-purpose storage companies were limited, but he noticed that rich media had unique storage requirements that existing storage products didn't serve

ISILON SYSTEMS INFO

Headquarters: Seattle, WA
Founded: January 2001
Employees: 40
Funding $8.4 million from Atlas Venture and Madrona Venture Group
URL: www.isilon.com

well. In addition to streaming audio and video, what Patel calls “content-driven applications” include medical imaging, image libraries and more. Isilon Systems set out to address this specific but large market.

Most enterprise storage traffic is transactional. It involves both reading from and writing to disk frequently. For rich content, capacity needs are larger and there are far more reads than writes. Content is requested more often than it is stored, and many users may request it simultaneously. That calls for different storage mechanisms.

Isilon’s founders didn’t come from the storage industry. While that could be seen as a handicap, Patel believes it’s actually an advantage. “Typically what we find are a lot of evolutionary steps in storage,” he says. Isilon’s team, by contrast, is made up of experts in distributed computing, networking and operating systems. As a consequence, Patel says, “We didn’t have any preconceived notions about how a storage system was supposed to be built.” Isilon’s network attached storage product uses a new kind of distributed operating system that combines RAID technology for spreading data across many disks directly into the file system.

This approach saves significantly on cost, and also makes the system much more manageable and scalable. All storage can be virtualized into one pool regardless of the number of physical devices underneath it. Compared to existing storage virtualization systems, Isilon allows the storage pool to be configured with more flexibility and reconfigured with no downtime. On the cost side, says Patel, “We’ve built our product using low-cost commodity hardware. That decision allows Isilon to focus the majority of its resources on software, which creates a compelling business model.” Patel promises that Isilon will deliver storage that’s more intelligent and significantly less expensive than traditional high-performance storage systems.

Even in the current environment, Patel sees demand increasing. “Just because there is a downturn doesn’t mean that the need for storage has shrunk,” he argues, “just that their budget has shrunk a bit.” Because Isilon focuses on the needs of a growing market segment, and its product reduces acquisition and management cost while increasing performance, Patel thinks it has a good story to tell even now.

Joltage Networks — Unlicensed wireless gets a jolt

Wireless networks using the 802.11 (or WiFi) protocol are springing up everywhere (SEE **RELEASE 1.0**, NOVEMBER 2001). Hotels, airports, cafés, corporate campuses and conferences (including PC Forum) are setting up access points to allow users within range to connect to the Net. But these wireless nodes are mostly isolated from one another. Enter Joltage Networks, with a plan to form the world's largest broadband wireless network.

JOLTAGE NETWORKS INFO

Headquarters: New York, NY
Founded: August 2001
Employees: 14
Funding: Seed funding from private investors
URL: www.joltage.com

Joltage founder and chairman Andrew Weinreich is on his third startup, sandwiched around a near-death experience when he was hit by a car in London. After selling his first company, social network hub SixDegrees, he started SkyForge, a wireless consulting firm. There, he saw the initial excitement about wireless applications disintegrate when it became clear that wireless networks weren't up to snuff. "The mass market has no tolerance for poor connectivity," Weinreich says. "The idea of the Internet taking off in a huge way as it did on the desktop wasn't going to happen in the wireless space until there was broadband."

Fortunately, 802.11 provides a solution. It offers speeds up to 11 megabits per second, and because it uses unlicensed spectrum, it doesn't require a carrier in the middle. Laptop vendors are starting to build 802.11 cards into their machines by default, and thousands of individuals are purchasing 802.11 access points for wireless home networks, in addition to the corporate and public-access deployments.

What's needed is a way to stitch together all those access points. Companies such as Wayport and Mobilestar (recently acquired by VoiceStream) allow for roaming across 802.11 wireless networks they deploy, but they have relatively small footprints. At least three startups have broader visions of linking thousands or even millions of wireless nodes; all of them are participating in PC Forum. Joltage is debuting as a company. Boingo and Sputnik are participating in the open-spectrum cluster on Tuesday (SEE PAGE 69).

Joltage seeks to expand the footprint of wireless access points, rather than just serving as an aggregator. It is counting on viral distribution of its free software for providers of wireless connectivity, made available directly and through channel partners with whom it will share revenue. The provider software turns any access point, whether in a home or a business, into a node on the Joltage network.

When a user connects to a Joltage node, a Web page pops up that authenticates them onto the network and handles billing on a pay-as-you-go or flat-fee basis. Joltage serves as the virtual ISP, handling back-end authentication and providing a network-wide directory. It will share a percentage of revenues generated at an access point to the provider of that node, creating incentives for nodes to join the network.

Weinreich believes Joltage can succeed both as a standalone aggregator and as a supplier to mobile-phone carriers and other telcos. “It’s inevitable that all the long-haul carriers are going to get into this space. When they do they will need a software solution,” he says. The best thing about Joltage’s business is that its costs don’t go up as more nodes join the network. Says Weinreich, “If we play our cards right, there’s an opportunity for infinite scale.”

Next Net Appliance — The real wireless Web

Next Net Appliance delivers an honest-to-goodness desktop Web experience to mobile devices. And it does so on today’s wireless networks. Co-founders Suneet and Raj Tuli started several companies in the scanning and imaging fields. Among the challenges they faced was squeezing multi-gigabyte high-resolution scans onto smaller hard drives. As they watched the spate of wireless Internet announcements in 1999, they saw a parallel in the need to squeeze Internet content through limited-capacity wireless data connections.

NEXT NET APPLIANCE INFO

Headquarters: Montreal, Canada
Founded: February 2000
Employees: 18
Funding: $1.5 million from founders and angels
URL: www.nextnetappliance.com

What was on the market, they concluded, wasn’t good enough. “We went on a user’s mission to try to get the wireless Internet,” recalls Suneet Tuli, “and discovered that our prescriptions of what we wanted the wireless Internet to be were not what was being delivered. It was not the Internet we had become accustomed to.” The biggest issue was (and is) speed. Today’s wireless networks deliver no more than 10 kilobits per second of data, and often less, making the wireless Web a stripped-down and tedious experience. The Tuli brothers began developing a software solution to these limitations. They hooked up with Craig Danuloff, former ceo of e-commerce software vendor iCat, to help bring the technology to market.

Next Net’s solution is to split the processing of a Web page intelligently between the handheld device and a server on the other end of the wireless connection. “In essence, we developed a client-server architecture that analyzes each page from a time-and-motion perspective and selectively splits the processes between a back-end gateway server and a front-end client,” explains Tuli. Using this approach, Next Net can deliver Web pages to wireless devices in three to eight seconds. Users see full graphical Web pages, instead of bare-bones text. “This allows the billion or so existing Web pages to be used without modification, so browsers see what they expect and Web applications require no new learning curve,” says Danuloff.

Because it offloads processing from expensive wireless devices to commodity servers, Next Net's approach also has significant cost benefits. Though it sees itself as a software company, Next Net has created reference designs for cheap special-purpose handheld devices that display Web pages by sharing the wireless connection of a mobile phone. It is working with wireless carriers and distribution partners, some of whom may private-label the devices as part of their offerings. In other cases, partners may license Next Net's software and incorporate it into their own devices.

Next Net's solution will remain valuable once much-hyped 3G wireless systems are deployed. For all the promises of amazing speed, the next-generation systems have significant capacity limitations. Next Next reduces the bandwidth required for transmitting Web pages by a factor of 10 to 30. That creates benefits for both carriers and users, Tuli says: "In a packet-based environment, the cost to the carrier is not how many people are online at any one time; the cost to the carrier is how much data or how many packets are being consumed. When you reduce the number of packets, you create additional capacity for them to serve additional users."

SoloMio — Between the green and the red

When your mobile phone rings, you have two choices. Push the green button ("talk") to take the call, or hit the red button ("end") to send the caller into voicemail. That binary choice fails to do justice to the range of situations in real life. Is the call urgent? Is it someone you want to call back in an hour... if you knew they were available? Are you sitting in the audience at a conference, unable to talk out loud?

SoloMio gives people these kinds of options. When a call comes in, the receiver sees a menu on his or her phone, including taking the call or sending back a question such as, "Is this urgent?" The SoloMio system manages the session and keeps the interaction consistent across different networks or communications modes. "There's no requirement that the caller have any special service or phone," says ceo Richard Schwartz. "There's a voice interaction for the caller and a data-menu interaction for the subscriber."

Though it's a startup, SoloMio already has offices in three countries and partnerships with Ericsson and Cap Gemini Ernst & Young. That's partly attributable to its being a spinoff of e-business software vendor Vignette, and partly because of the business it's in: selling solutions to mobile-phone operators, most of whom initially will be in Europe. Schwartz was senior vp at Vignette after it

SOLOMIO INFO

Headquarters: Austin, TX
Founded: December 2000
Employees: 40
Funding: $10 million from Austin Ventures, Vignette, Techxas Ventures and AV Development Labs
URL: www.solomio.com

acquired his previous startup, Diffusion. Earlier in his career, he wrote the Paradox database at Ansa, which in turn was bought by Borland, where Schwartz became cto.

"Operators and end-users now understand that there are ways to communicate from the mobile device even when a voice call is not practical," says Schwartz, pointing to the success of short message service (SMS) text messaging in Europe and the RIM Blackberry in the US. Existing services send subscribers SMS messages listing calls they missed, but SoloMio gives the subscriber new options while the caller is still online and available. And that creates a business opportunity, Schwartz explains: "Because both caller and subscriber perceive a kind of 'call completion', though not voice-to-voice, both parties are willing to pay for it."

SoloMio leverages Vignette's personalization, analytics and interface-design expertise. "For this to be a broad market service, it can't depend in any way on setup or configuration by the end-user," says Schwartz. The system watches user actions and automatically tunes its menu options to be more relevant for callers and receivers. Interestingly, SoloMio is already seeing cultural differences in its trials. Users in Spain and Italy wish they could answer every call, so they see SoloMio as a way to take calls they would otherwise not answer. Germans and Swiss care about efficiency, and use SoloMio to reschedule calls for a time that better fits their schedules. The British are heavy users of SMS, and often use SoloMio to shunt calls into that channel.

For carriers, SoloMio generates additional voice and SMS traffic, which they charge for. This is particularly important for European operators, which generate a quarter of their revenues from "settlement" fees when the two parties to a call are on different networks. SoloMio believes the payback period on its service is less than a year.

Zambeel – Storage inside out

Zambeel's approach to storage gives it unique levels of scalability, manageability and flexibility. The company was in stealth mode for most of last year. Even so, its strong management team and high-profile investors such as Vinod Khosla of Kleiner Perkins gave it a significant buzz quotient, especially with storage being one of the few technology sectors continuing to attract funding.

The problem with existing storage products, says ceo Darren Thomas, is that on the inside they are built around old technologies, even though on the outside they use faster connections. Thomas joined Zambeel last year from Compaq, where he was responsible for strategic direction of the storage group. Zambeel, he says, is the first company truly to rethink storage from the ground up: "Instead of having just a gigabit Ethernet fabric connected to the box, the gigabit Ethernet fabric inside the box is part of the connection. Our box is kind of inside out. The insides of the box are exposed to the outside world." (Of course, Zambeel's software keeps the data stored in the system controlled for security purposes.)

ZAMBEEL INFO

Headquarters: Fremont, CA
Founded: September 1999
Employees: 120+
Funding: $65 million from Kleiner Perkins, New Enterprise Associates, Integral Capital Partners, Amerindo, Aurora Technology Funds, Juniper Networks, Merrill Lynch, Armada Venture Group, Mitsui Venture Partners, Morgan Keegan and Sands Brothers
URL: www.zambeel.com

The big benefit of this approach is flexibility. Many storage vendors talk about "virtualization," meaning that storage can be managed across different drives and servers. Zambeel takes virtualization to a new level. Every time a new piece of equipment is added, it becomes part of the shared pool, and can be managed according to a consistent set of policies. Also, the same infrastructure can support multiple projects with different performance characteristics.

Speed and capacity are the most common benchmarks for storage systems, but Thomas says those performance numbers miss the point. "We have scalable performance," he explains. "Our system does not have a top end to it. You just put more hardware in and it goes faster." The real question for customers is how much performance they need and are willing to pay for... and how easy it is to manage the system as it scales. Just having capacity isn't enough; IT departments must deal with backups, failover, load balancing and moving data around as needs change. Typically, for every dollar a company spends on storage, it spends four to seven dollars maintaining that storage. Zambeel cuts out much of that cost.

Thomas feels that demand for storage will pick up in late 2002 or early 2003. Many enterprises built up excess storage capacity during the boom, which they are still riding today. Says Thomas, "Everybody is burning information to disk at enormous rates. The excess we have in the industry is going to bleed off. We're going to have to increase capacity."

In such an environment, Thomas believes Zambeel is in a good spot, because of its technology and the experience that he and his team have in the space. He differs from Isilon's Sujal Patel (SEE PAGE 79), arguing that deep storage-industry experience is essential. Others are just now running into issues he learned to address at Compaq, Thomas says. "The storage startup world is made up of a whole bunch of people who didn't use to be storage people," he notes. "Storage wasn't cool five years ago." ■ **R 1.0**

COMING SOON

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